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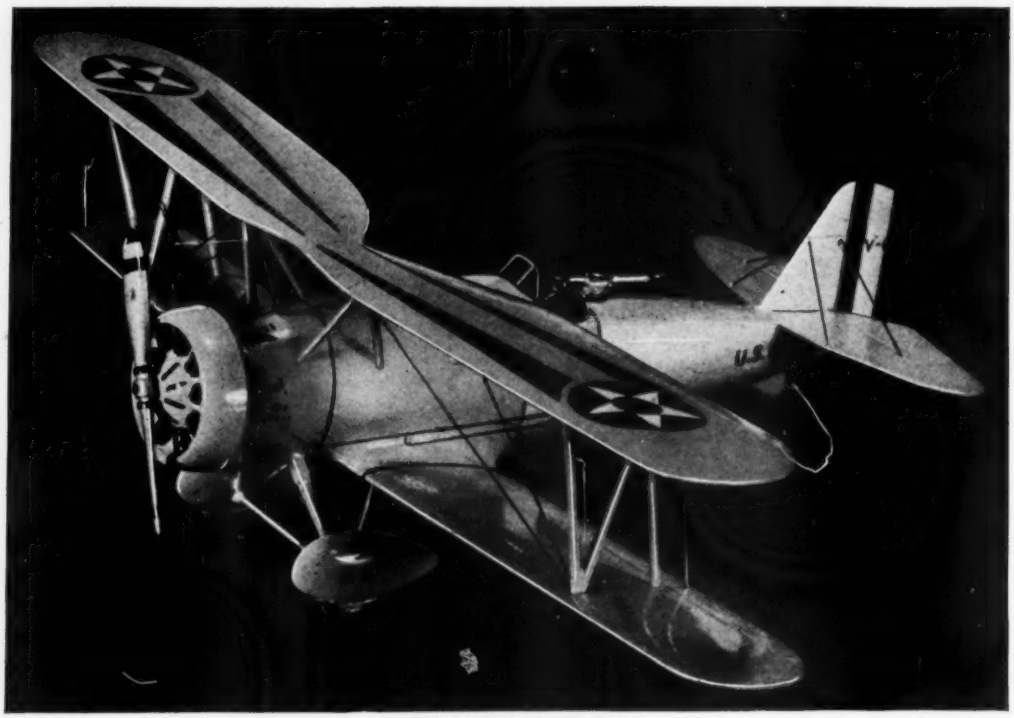

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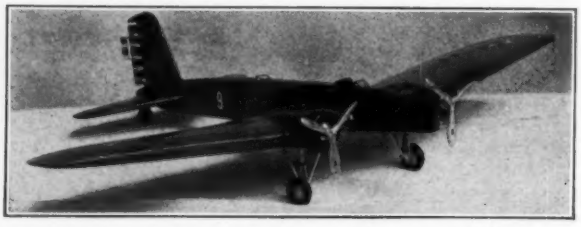

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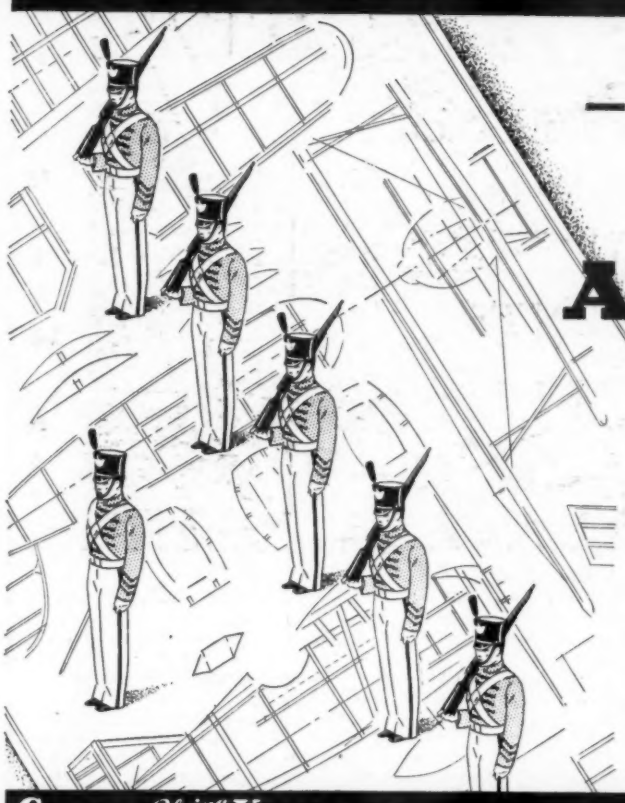

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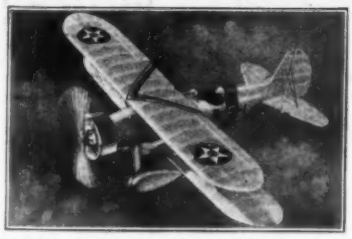

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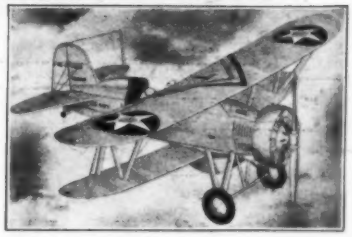

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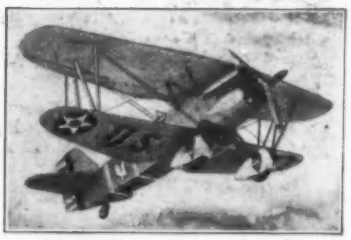

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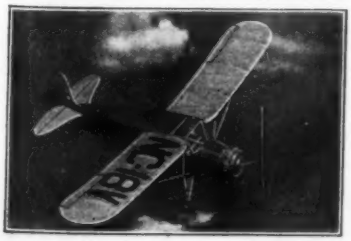

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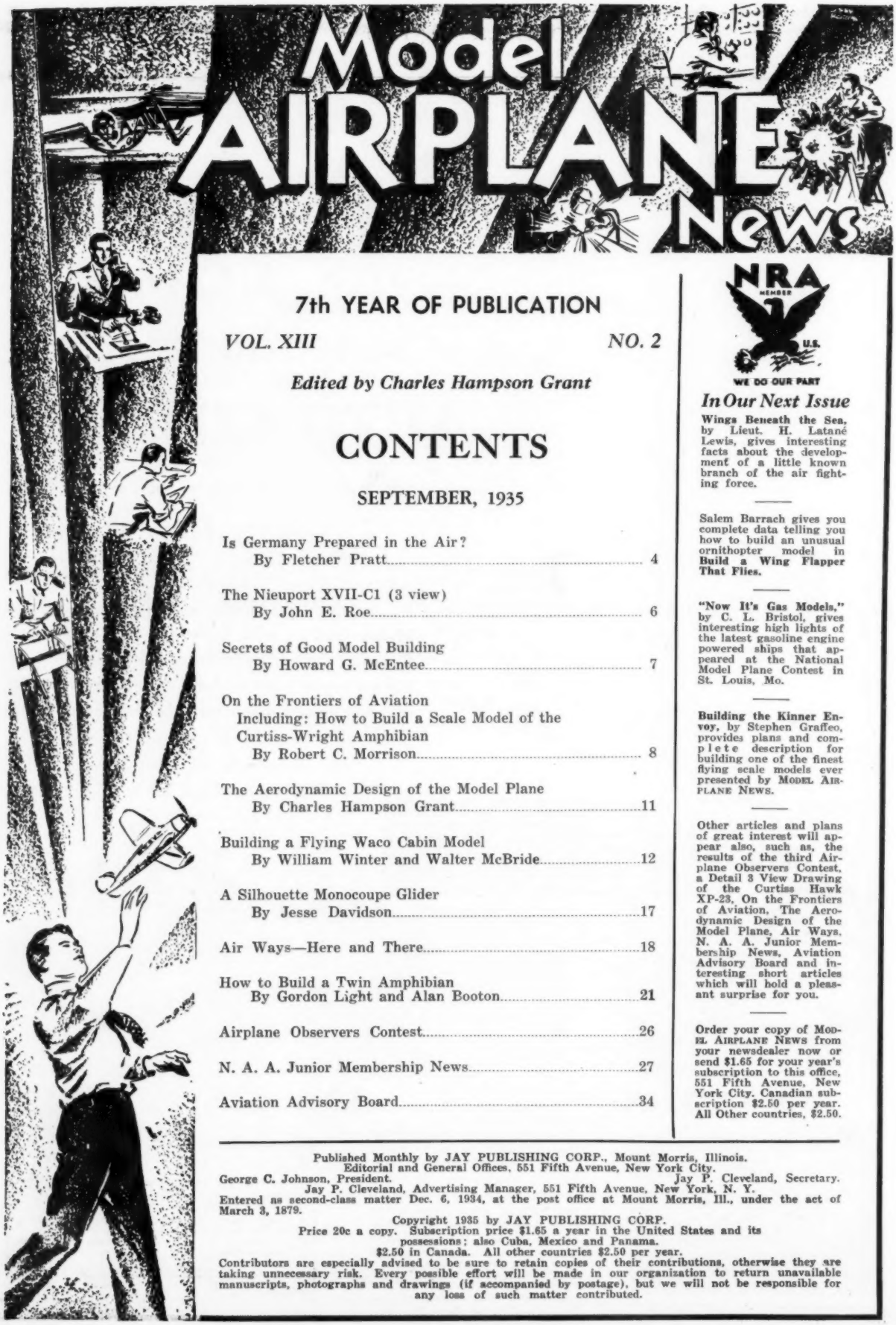

7th YEAR OF PUBLICATION

VOL. XIII *NO. 2*

Edited by Charles Hampson Grant

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SEPTEMBER, 1935

In Our Next Issue

Wings Beneath the Sea, by Lieut. H. Latané Lewis, gives interesting facts about the development of a little known branch of the air fighting force.

Salem Barrach gives you complete data telling you how to build an unusual ornithopter model in **Build a Wing Flapper That Flies.**

"Now It's Gas Models," by C. L. Bristol, gives interesting high lights of the latest gasoline engine powered ships that appeared at the National Model Plane Contest in St. Louis, Mo.

Building the Kinner Envoy, by Stephen Graffeo, provides plans and complete description for building one of the finest flying scale models ever presented by MODEL AIRPLANE NEWS.

Other articles and plans of great interest will appear also, such as, the results of the third Airplane Observers Contest, a Detail 3 View Drawing of the Curtiss Hawk XP-23, On the Frontiers of Aviation, The Aerodynamic Design of the Model Plane, Air Ways, N. A. A. Junior Membership News, Aviation Advisory Board and interesting short articles which will hold a pleasant surprise for you.

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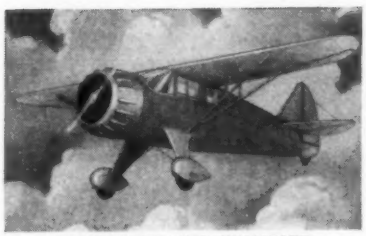

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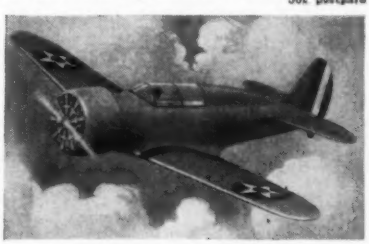

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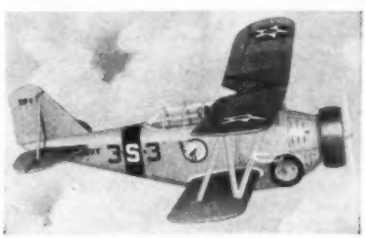

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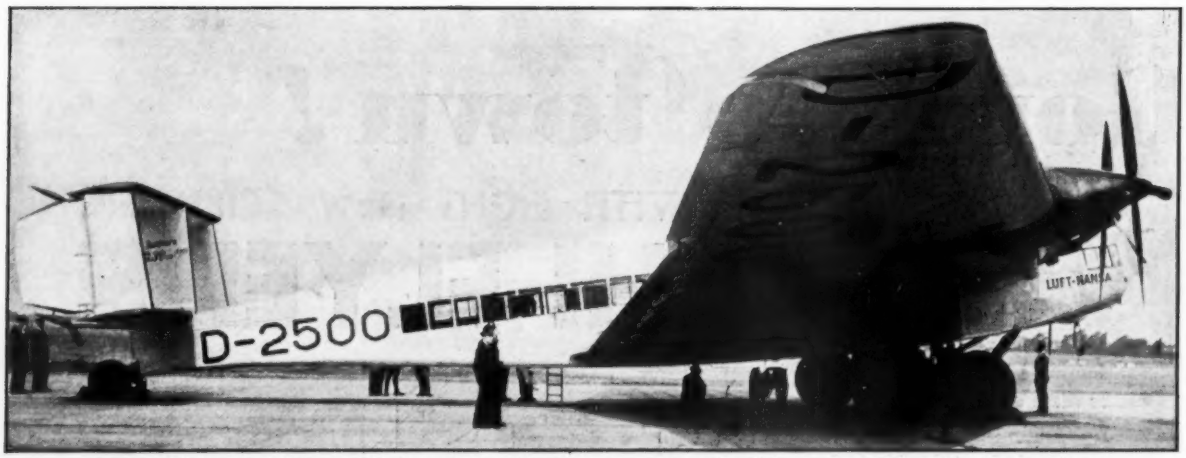


Germany's biggest airliner, the Junkers G-38. It carries 41 people and weighs 31 tons. The cabin has two decks

Is Germany Prepared in the Air?

How Germany Has Developed an Efficient Air Force in Spite of Many Difficulties Thrown in Her Path by War Treaties

By FLETCHER PRATT

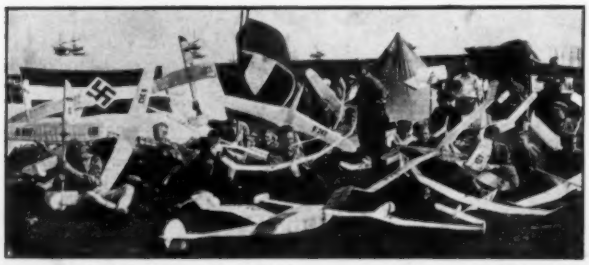
THE original draft of the Treaty of Versailles which ended the World War, prohibited Germany from building powered airplanes or airships; it even prohibited the flight and landing of powered airplanes over and on her territory. The object was to make certain that Germany neither rebuilt the military air service which had given the Allies so much trouble during the war, nor bought planes abroad. At the time the idea looked like a clever one because in 1918 all aviation was military aviation.

The Heinkel light transport, the pride of German aviation. It carries four passengers at 220 m.p.h.

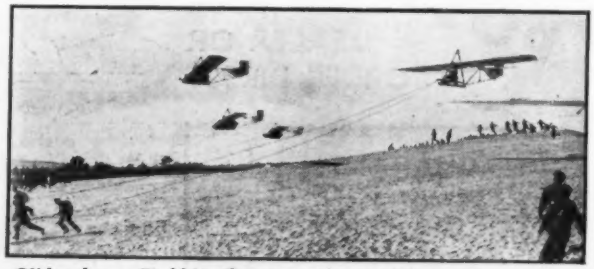
The Germans grumblingly signed the treaty, threw their fine air service into the ash can and went home to experiment with gliders. For a couple of months all was serene; then a couple of events took place that made the idea of prohibiting flying in Germany seem not quite so brilliant as it had at first. A pair of French fliers started on a trip from Paris to Praha in Czechoslovakia. They were forced down in German territory by bad weather and promptly thrown into jail for violating the treaty laws by landing on German soil. The same fate befell an English pilot who was taking a machine over to join the Army of Occupation along the Rhine. It was in vain that the Allies protested the law was not supposed to apply to their citizens; the Germans replied quite reasonably that it was the law and had to apply to everybody.

About the same time French and British airplane builders had begun to feel the pinch peace brought on them after four years of working at capacity for their governments. They had big factories and technical staffs, but the market for airplanes had closed down, nor did it seem likely to open up again unless they could develop new markets. In both countries firms building big, long-distance planes, notably the British Handley-Page Company, began seriously to consider starting mail and passenger lines. Now a mail and passenger airline, to pay well, must cover considerable distances; if it only goes (for instance) from Brussels to Paris so much time is spent in reaching the airdrome and waiting for the next plane that the passengers may as well travel by rail. And you cannot go any great distances in Europe without hitting either Germany or Austria. You cannot go to Poland at all, or Denmark, Sweden or Czechoslovakia; you cannot go down the Danube, the only great aerial highway across Europe which avoids the dangerous mountain belts.

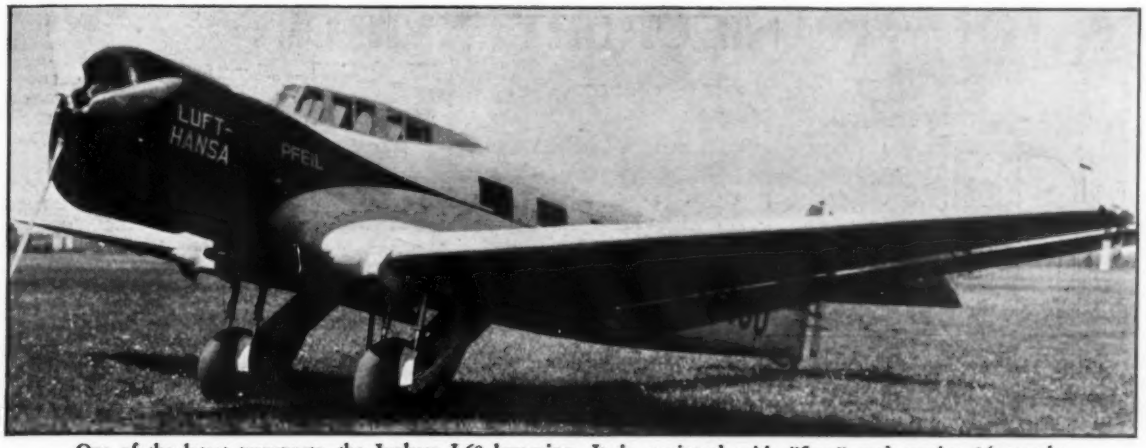
Therefore, prohibition of flying across Germany and Austria meant prohibition of airlines. So the airplane companies in the Allied countries protested to their governments about the same time that the absurdity of the no-flying restriction became evident for other reasons. The restriction was taken off and the airlines started op-



Some of the 750 boys that took in a recent glider competition in the Rhon Mountains. This is part of their aviation training



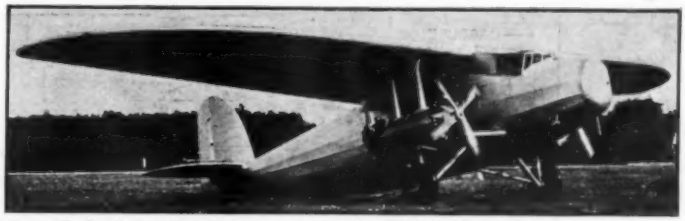
Glider day at Trebbin, Germany, gives training to future pilots. Four gliders are in the air at one time



One of the latest transports, the Junkers J-60 low-wing. It is equipped with "flaps" and carries 14 people

erations wondering what would happen next.

Then the companies discovered that the provision against building airplanes in Germany prevented them from getting any repairs or spare parts in that country. About the same time the Allied military commission supervising German disarmament, reported that the restriction against building airplanes was of no use so long as the Germans were allowed to build gliders and also that the Germans were simply doing their airplane building in Sweden or Holland where the Allied commissioners had no control over them. They figured it would be easier to keep German military planes out of the skies if the Germans were allowed to do their building at home where an eye could be kept on them. So that restriction was dropped also.



One of the latest Dornier transports, the DO.K. It has four motors and develops about 145 m.p.h.

By this time it was well into 1920 or 1921. The new treaty let the Germans build all the commercial planes they liked but prohibited them building military planes, having a military air fleet or training aviators for military service. In the interval since the war, the Allies had moved ahead so rapidly in the air that they quite reasonably supposed they were ahead of German aviation for good. The new American high-speed planes, the Schneider Cup racers in France and England, the Handley commercial machines and the giant Caproni weight-carriers were better than anything Germany had ever turned out, so why should they fear her?

The German constructors, released from the treaty, were faced with a very special problem in design. They had to develop a peacetime flying service that would compete with the Allied commercial airlines, without being able to compete with them by learning from small speed planes (since these were regarded as fighters by the military commission) and without being able to learn anything from building huge weight-carriers (since the commission regarded them as bombers). They solved the problem by going back to first principles, most of them new principles developed out of the two or three years intensive scientific study of gliders.

When the new Junkers machines (the first of Germany's post-war airplanes) came out, they surprised everybody. They were all-metal, and corrugated metal at that, which nobody had supposed possible as a material for airplane construction. They were cantilever monoplanes at a time when everybody was building biplanes and experimenting with triplanes; they had tapered wings and completely enclosed cockpits—all features either completely new or never brought into association before. With these new machines the Germans established a commercial airline, the Lufthansa, which, thanks to the central location of its headquarters at Berlin, was soon the rival and the successful rival, of every airline in Europe. For the new Junkers machines proved themselves; they could not beat the fastest French ships in speed, nor the largest English ships in size, but they struck a balance between these two qualities, and outdid both French and English in all-round efficiency.

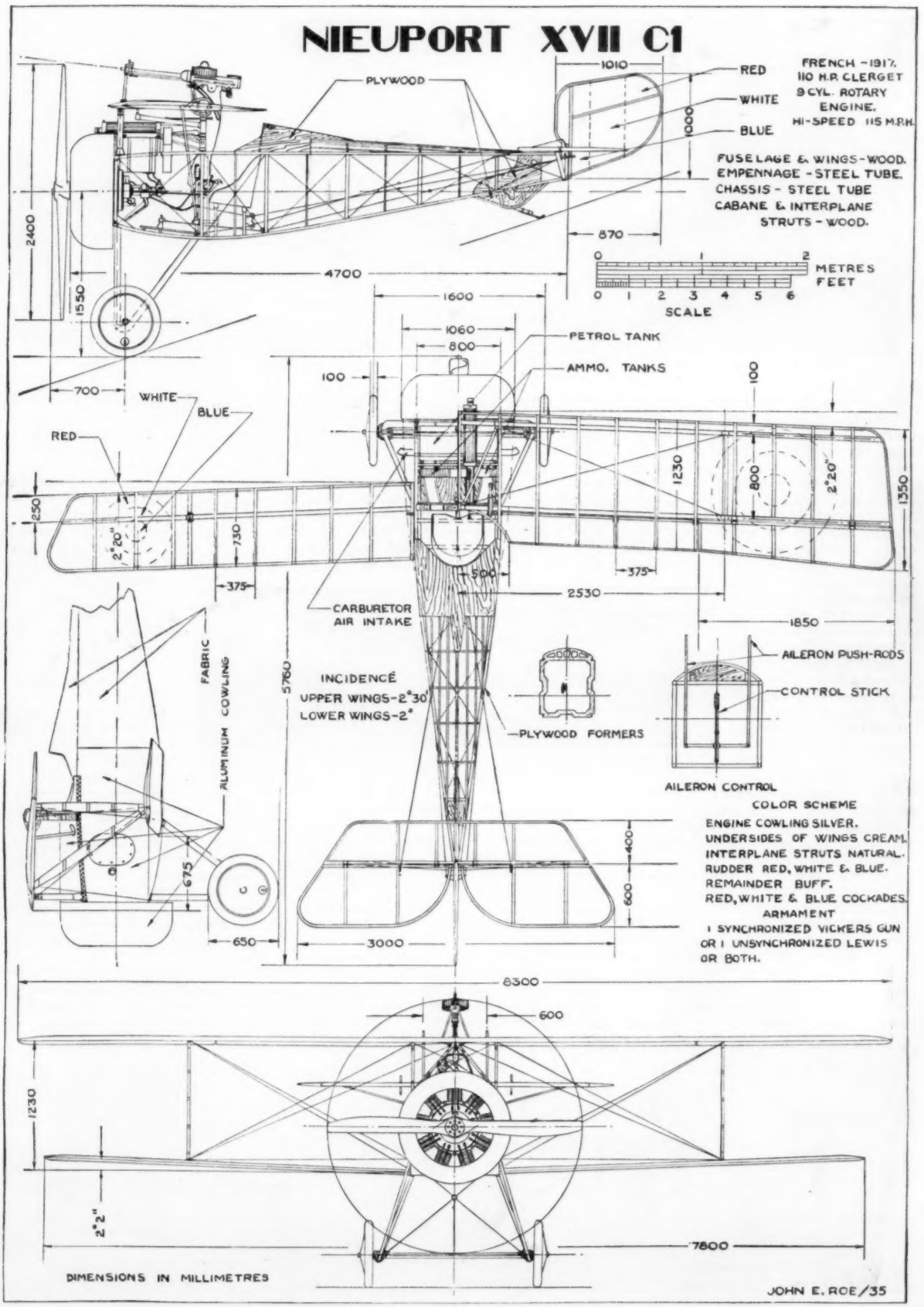
Things rolled along in this way for several years. The French, British, and Italian constructors caught up with the Germans. Meanwhile, Germany was still prohibited from having a military air service and they were feeling pretty indignant about it, especially since the countries all around her frontiers—France, Poland, Czechoslovakia—were filling the air with huge fleets of warplanes, and any German could picture to himself what would happen if one of those countries should decide to send over an air fleet and start dropping bombs.

Newspapers and magazines were filled with articles about the possibility and finally some ex-war fliers organized the

(Continued on page 36)

A Dornier-Wal "Boat" that flies the Atlantic from Cadiz, Spain, to South America, refueling at sea

NIEUPORT XVII C1



Secrets of Good Model Building

Hints from an Expert Model Builder That Will Enable You to Build Better-Shaped and Stronger Fuselages

By HOWARD G. McENTEE

PART II

IN THIS, the second article of this series, we shall continue the subject of fuselage assembly. The last points considered concerned the construction of fuselage sides in the rectangular, cross-section, built-up type of model. Two sides are built, as nearly alike as possible, of course. The same drawing on the assembly board should be used. It is not advisable, however, to assemble the sides one above the other. They should be made one at a time.

Assembling the two sides together is simple, but very seldom described, so we shall go into it quite thoroughly. It is easiest to start the assembly at the point of the fuselage where the wing is fastened. Using four crosspieces, two top and two bottom, the work begins. Usually, the fuselage is built upside down, since the top is more often designed with less curve from front to back than the bottom. Two parallel lines for the sides must be drawn on the board together with a center line for accurate line up and the crosspiece locations must also be put in. Lay the two sides, bottom longerons up, on their respective side lines and put weights across them to hold them there while the work progresses. The weights may be made from lead bar in lengths from two to four inches. These bars, which come in about 18" lengths with a cross section of about ⅜" x ¼", are used by storage battery repairmen and may be obtained from them. They come in very handy in other assembly work also, as we shall see later on.

The four crosspieces are now cut to size and fitted in place with plenty of glue. When using balsa, the joints are almost always of the butt type so the glue should be spread in the corners to make a complete but thin covering for the joint. While the glue is wet, the fuselage should be propped on both sides with small straight side bottles and cans to hold it in shape. The rear of the fuselage should be propped up with a block or stick of wood so that both sides are the same height above the board. The assembly must now be left alone until it is completely dry. If the above work is done accurately, the rest of the assembly is relatively simple.

The next point to tackle is the tail end of the framework, and this may well be done while the work is still on the board in order to take advantage of the center line that was previously drawn. It is helpful to omit the rear upright in both sides when they are first made. This leaves the four longerons free at the extreme rear end and makes it easy to line them up. They may be tapered somewhat so that when the respective top and bottom longerons are fastened together, the joint will be only about the width of one stick.

If a rudder post is used, it may be put in place while the rear ends are being fastened. This will assure its being vertical. If no rudder post is used, a single upright will finish the tail of the fuselage. The remainder of the crosspieces, top and bottom, may now be installed very easily. If the fuselage assembly is carried out as described above, the sides will have a slight smooth outward bow, which will doubtless approximate that called for on the drawings. If the crosspieces are cut to size according to the drawing, they may be either slightly short or long to fit in place. If the former is the case, they may be fitted by pulling the fuselage sides together with short pieces of soft wire, while in the latter case, the crosspieces are snapped in place and held by the natural spring of the sides. In any case it is very desirable to put in only two crosspieces at a time, one top and the corresponding bottom one, and allow them to dry well before putting in the next set. It may sound like a long job, putting in only one or two pieces and allowing them to dry completely before proceeding, but it is the only way to get a good job. Most beginners try to do too much at a time, and anyway, there is plenty of work to be done on other parts of the ship while a particular joint is drying.

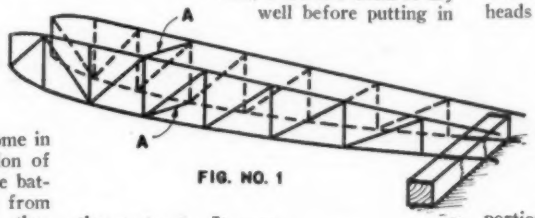


FIG. NO. 1

The nose of the fuselage is left until last as there are often sharp curves to be made and it is best to have the rest of the frame well fastened before attempting them. Usually a nose block or piece of some kind is used, which is often in the form of a radiator or radial motor, and the forward ends of all longerons glued to it. The use of a solid nose block greatly simplifies construction and adds strength and weight where it is most needed.

If the curve in the longerons is very great at the nose, it is safest to wet them well and hold them in the desired position until dry. As mentioned before, never try to glue a joint on wood that is even slightly moist, as glue will not hold. A rubber band around the four longerons will hold them firmly in notches cut in the nose block while the joints are drying.

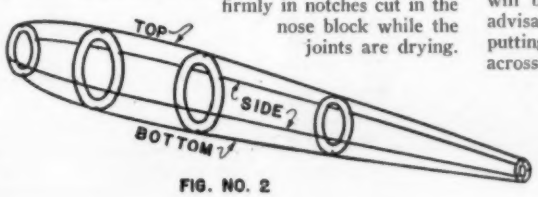


FIG. NO. 2

Any crosspieces between the nose block and the pieces first put in place are now installed and the bare frame is finished. Some sort of rounding on the nose and fuselage sides is often used. The nose streamlining may well be of bamboo strips as they add more strength than balsa and can absorb hard shocks much better. The simplest type of streamlining consists of a single strip down the center of each side. This gives a pleasing rounded effect and adds very little weight. The appearance is much improved because the box effect of a rectangular fuselage is removed.

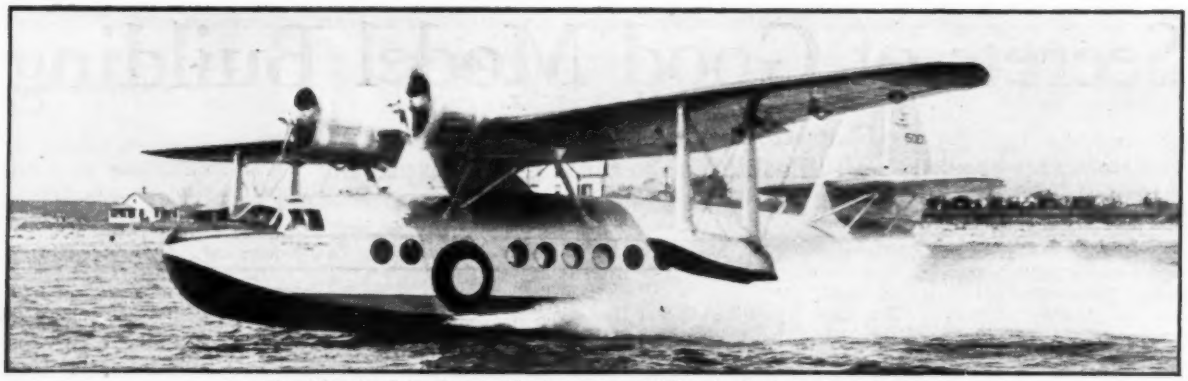
More complicated streamlining calls for rounded formers with notches into which are glued wood or bamboo strips. If this system is carried out completely on all sides of the fuselage, it is possible to achieve a perfect oval or round streamlined cross section. The weight is rather excessive, however.

Oval or round fuselages may also be made in several other ways. One is to cut out a complete set of oval formers or bulkheads which are held together by the streamline strips themselves. The centers of the formers are cut out to decrease the weight and allow the rubber to pass through. The formers have to be very accurately planned and cut to insure a smooth outline for the finished fuselage. It can easily be seen how a former which is cut a bit too large in proportion to the rest will cause a swelling or lump in the fuselage at its particular station.

The assembly of this type fuselage is started by taking the two largest formers and fastening them together with the topmost and lowermost stringers or longerons. It is best to use one on each side also making four in all. These should be glued in place and allowed to dry well. Since all surfaces of such a fuselage are rounded, it cannot be lined up on a board as the rectangular type was, so the lining up must be done mostly by eye, and it is needless to caution the builder to go slow at this stage of construction. The next step in assembly is to install the remainder of the formers working progressively back toward the tail. When all the formers are fastened by the four original stringers, the remainder of the stringers may be put in place.

Since the assembly of all formers and the original four stringers is, of necessity, very frail, each subsequent longeron must be bent to the proper curve before being installed, as otherwise the fragile frame will be pulled out of shape. Also, it is advisable to install the longerons in pairs, putting them one on each side diagonally across the fuselage. In this way, the warping tendency is mimimized. Never put all stringers on one side and then all on the other as the result would probably not resemble streamlining.

(Continued on page 43)



The Sikorsky S-43, the world's largest amphibian. It climbs on one motor

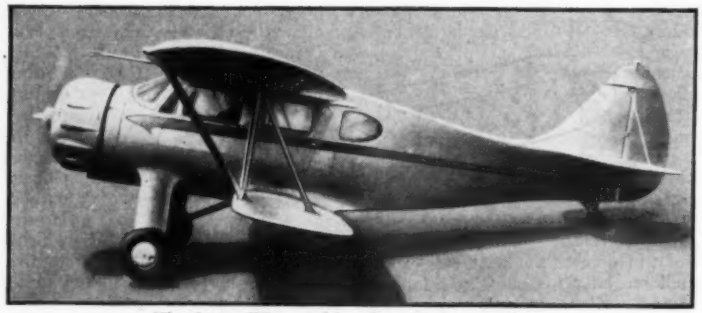
On the Frontiers of Aviation

Facts of Interest Concerning the Developments in Army, Navy, and Commercial Aircraft

By ROBERT C. MORRISON

THE only two countries actively engaged in airship construction and operation are the United States and Germany. Because of the unfortunate demolition of the "Akron" and "Macon," our giant Navy "flying battleships," Germany has taken the lead in the zeppelin industry. Her "Graf Zeppelin" has performed admirably on its numerous transatlantic voyages and her new L.Z. 129, which is almost completed, will greatly strengthen Germany's zeppelin superiority.

In the nonrigid "blimp" class, the United States is by far the most successful. There are a great many privately owned "blimps" throughout the country and almost as many in the U. S. Army and Navy. The United States is the only country that has an all-metal dirigible, the Navy's "bubble" blimp. This airship has been in operation for over five years and has stood up very satisfactorily during that period, so much so that another one is likely to be built shortly! Rumors have been circulating about Washington that the Government may let a contract for such a ship. The airship is intended to be about the size of the "Los Angeles" and will be covered with a thin metal Alclad skin. It will probably be built for commercial use and strenuous experimentation with the hopes that still larger airships will be built of that type in the near future.



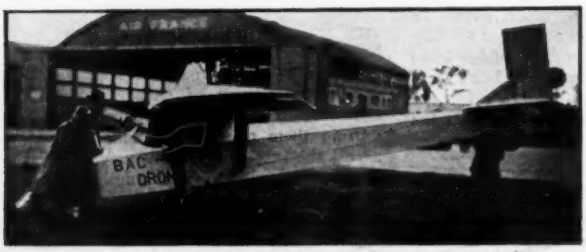
The latest Waco cabin plane. It is very fast

It will be interesting to know that there has never been a paying passenger killed or injured in an airship to this date!

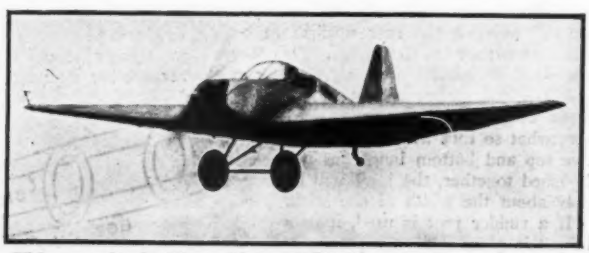
Our foreign export of aircraft is steadily on the upturn. The Royal Air Force of England has recently ordered two of our Douglas DC-2s powered by English Pegasus engines. These will undoubtedly be subjected to strenuous testing as was the Northrop attack that was purchased by the R.A.F. some time ago. The R.A.F. has set up a program to purchase various American aircraft in order to study their advanced methods of design and construction so as to employ such methods with regard to their own airplanes.

The Douglas Company has been working on a new pursuit plane recently! Slowly but surely more news keeps coming to light on Douglas' Navy "mystery" patrol boat, popularly known as the XP3D-1. The plane is powered by two twin Wasp engines and carries a crew of eight. Six machine-guns and two tons of bombs may be fitted into the huge plane. The plane is so large that a pit had to be dug in the floor of the factory to allow for the plane's height. It is said to be able to carry a full military load of 2,500 pounds on one engine.

The reorganized Great Lakes Aircraft Corporation has been busily engaged for the past year in Navy work. They have been working on a $125,000 torpedo plane to launch a one-ton torpedo, a $91,000 diving bomber, and sixteen other diving bombers at $22,000 each. It was probably the $91,000 diving bomber that recently "undressed" in the air while Lee Gehlbach was testing it. The ship lost its top wing and came crashing down on Gehlbach. Though somewhat bruised, he managed to jump clear of the plane and land safely in his parachute. Two weeks later if one had been down in Virginia, he would have found Lee again leaping from a distressed



The 5 hp. plane that was flown from London to Paris by Kronfeld, the famous glider pilot, at a cost of $1.40



This two-place tailless plane speeds along at 112 m.p.h. using a 75 hp. Pobjoy engine. Weight 560 lbs.

The Fuller-Hammond low-priced commercial plane, powered with two 45 hp. engines

airplane. This time it was a spinning Grumman fighter. He also survived this accident with no injury. Two accidents have now taken place with these new experimental Grumman fighters, but a third ship of similar design has proved very successful under the testing of Lt. Taylor. Lt. Taylor recently demonstrated the plane at an air meet at Hicksville, Long Island, and won the spot landing contest in the ship! High speed is 240 m.p.h., and the ship is said to be very easy to maneuver.

In no way do the above-mentioned crashes disclaim the safety of American commercial aircraft, the aircraft that the general public flies in. Both ships were experimental, built mainly for speed and not safety.

Last year the Stinson Aircraft Corporation built several experimental airplanes. Two of these happened to be of the low-wing type (see page 18, July issue). However, at the present time none of these have been put into schedule production. The Curtiss-Wright Company also designed an experimental low-wing private plane along similar lines to one of the low-wing Stinsons. As a result the company has just been awarded an order from the Bureau of Air Commerce for one of the ships. It is known as the Curtiss Sparrow.

Russia has not been discouraged by the crash of their famed Maxim Gorky. They will build three more of like design in the near future.

A new Aeronca has made its appearance. Mr. Ray Grayson of Terrace Park, Ohio, has written us that a new two-place side-by-side low-wing Aeronca is now being tested at Cincinnati. The wing is tapered in chord and plan and is cantilever. The ship, which is about the same size as other Aeroncas, is of very clean design and must be much faster than its predecessors. The ship is said to be powered by a 70 hp. LeBlond instead of an Aeronca engine.

The new and unusual Curtiss-Wright Amphibian pusher

The fourth D.H. Comet has been completed. It will soon be turned over to France for mail-carrying duty. The Comet is a duplicate of the MacRobertson winner with minor innovations. The nose of the fuselage has been drawn to a very sharp point. The fuselage somewhat resembles a huge Eversharp pencil and is not as graceful in appearance as its predecessors.

Another DeHavilland Comet is going to be built for Mr. T. Campbell Black, winner of the MacRobertson Race. Black will attempt some spectacular flight in the plane when completed. The ship, which is expected to be ready by the latter part of this summer, will have dual controls and the same fuel capacity as the three MacRobertson racers. Improvements however will be made in the design and we may expect to see the fastest DeHavilland Comet yet built.

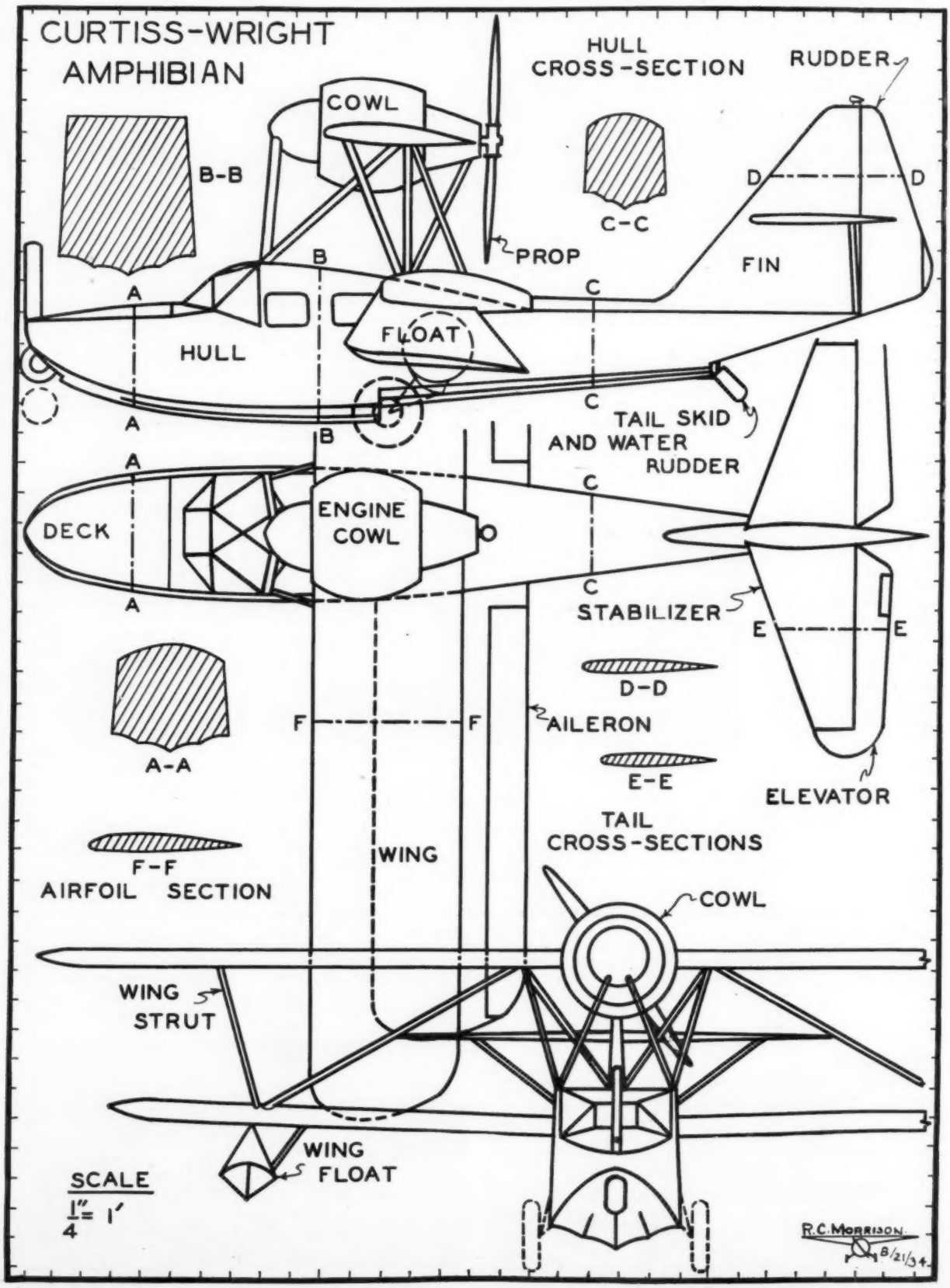
A military version of the DeHavilland Dragon Rapide has been built for the Royal Air Force. The plane has a gun pit on top of the fuselage just aft of the upper wing to protect the crew from enemy attack. It will be used in the R.A.F. as a coastal reconnaissance landplane and will be one of the fastest twin-engined biplanes in the R.A.F. Another new ship used for the same purpose as the D.H. Dragon Rapide is the Avro 652 low-wing twin-engined landplane. This is the fastest twin-engined plane in English military use. It is much slower than any of our modern commercial planes, doing only 195 m.p.h. at high speed.

A new English Monospar has recently been completed and is equipped with American Pratt & Whitney Wasp Junior engines. The plane is a twin-engined low-wing monoplane with considerable sweepback, a feature seldom seen on a low-wing plane. A crew of two and ten passengers will be carried in the plane. Cruising

(Continued on page 40)

The Waco W.H.D.—A fighter—This is one of the trimmest fighting and bombing planes ever developed

The hydro-autogiro recently developed and built by Short Brothers and tested by Cierva for the British Navy


CURTISS-WRIGHT
AMPHIBIAN
HULL
CROSS-SECTION
RUDDER
COWL
B-B
C-C
D
D
PROP
FIN
B
A
C
FLOAT
HULL
A
C
TAIL SKID
AND WATER
RUDDER
B
A
C
DECK
ENGINE
COWL
A
C
STABILIZER
E
E
D-D
F
F
AILERON
A-A
E-E
ELEVATOR
TAIL
CROSS-SECTIONS
F-F
AIRFOIL SECTION
WING
COWL
WING
STRUT
WING
FLOAT
SCALE
1"= 1'
4
R.C. MORRISON
8/21/34

The Aerodynamic Design of The Model Plane

ARTICLE No. 43 — CHAPTER No. 4

How Series and Twin Multiple Motors Compare in Efficiency with Single Motor Units

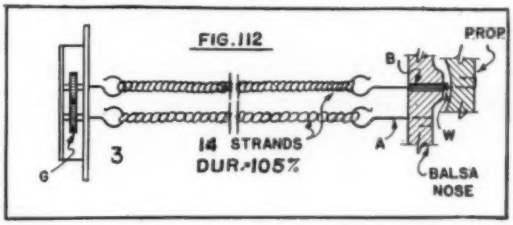
By CHARLES HAMPSON GRANT

IN OUR discussion of multiple motors last month we considered the value of gearing motors together in parallel, to one propeller. The next important combination that we should know something about is multiple motors geared together in series. This system creates the same effect as doubling the length of the motor when two motors are used, and tripling the length when three motors are used. Fig. 112 illustrates the arrangement of motors and gears required. Let us see what we can determine about the values of this system by a careful analysis of it.

First the gears must be located at the rear ends of the motors in order to obtain the desired effect. This means that the weight of the gears is in the rear end of the fuselage and tends to make the model tail-heavy. To overcome this condition the wing must be located farther to the rear of the model than in the case of single motor planes. This is most undesirable as the longitudinal stability is reduced considerably. To compensate for this fact larger tail surfaces must be used which add to the total weight of the model. In fact this whole system violates the important rule that as much as possible of the weight of the necessary parts should be located in the forward part of the ship, and that the tail surfaces should be made as light as possible. From this standpoint this system is not good.

Another important fact results from the use of the arrangement. All the motors *must be wound in the same* direction. This means that the twisting effect on the fuselage is proportional to the number of motors used, the same number of strands being used in the motors considered in any case. Thus, with this motor arrangement, the body must be made twice as strong, which means also twice as heavy as the fuselage required for a single motor, the type of construction being the same. We may say, therefore, that the weight of the fuselage is proportional to the sum of the torque of the motors. That is, the more torque the heavier the fuselage should be, and therefore the more motors used in the system, the heavier it should be.

In the geared motor combination considered in previous pages of this series of articles this condition does not exist. When the arrangement is used in which the gears are placed in the nose of the fuselage, the motors may be arranged so that the torque of one balances the torque of another. Briefly, any system in which the motors must be wound in *opposite directions is good,* while any system which requires the motors to be wound in the *same direction is bad.*



The prime object of using multiple motors is the desire to obtain greater flight duration. Now let us compare the performance of a plane with this type of multiple motor system with one using only a single motor.

Suppose we have a model which flies well with the power delivered by one motor of eight strands of ⅛" x 1/30" rubber. Hoping to increase the duration of the model we plan to use two motors in series with the gears located at the rear of the motors. The two gears are to be mounted directly on the two rear motor shafts and meshed with each other without an intermediate free gear, as in Fig. 112.

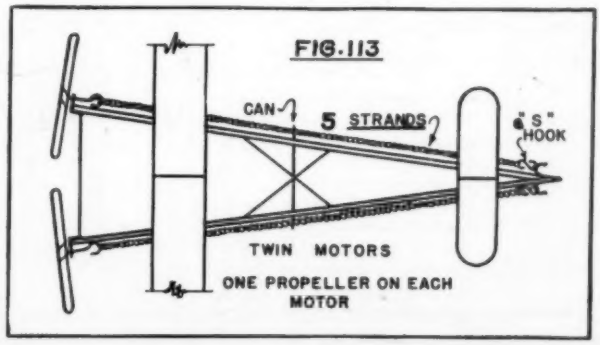
In order to provide the same torque in this case as in the case of the model with a single motor, the same number of strands must be used in each motor, (8). This means that considerable weight has been added. First the extra motor of eight strands weighs about 20% of the total weight of the single-motor model. Second, the gears and their mounting weigh 10% more; and third, the twist and tension of the motors on the fuselage has been doubled. This means that the fuselage must be twice as strong. In order to give every advantage to the multiple-motor system, we will say that the fuselage must be made only 67% heavier than the single-motor one. The average fuselage is about 30% of the total weight of the model, so we see that we have added 67% of 30%, or 20% of the original ship to the weight of the multiple-motored plane. Thus, with only eight strands in each motor, with the same torque delivered as in the case of the single-motored ship, we have 10% plus 20% plus 20%, equals 50% more weight at the least.

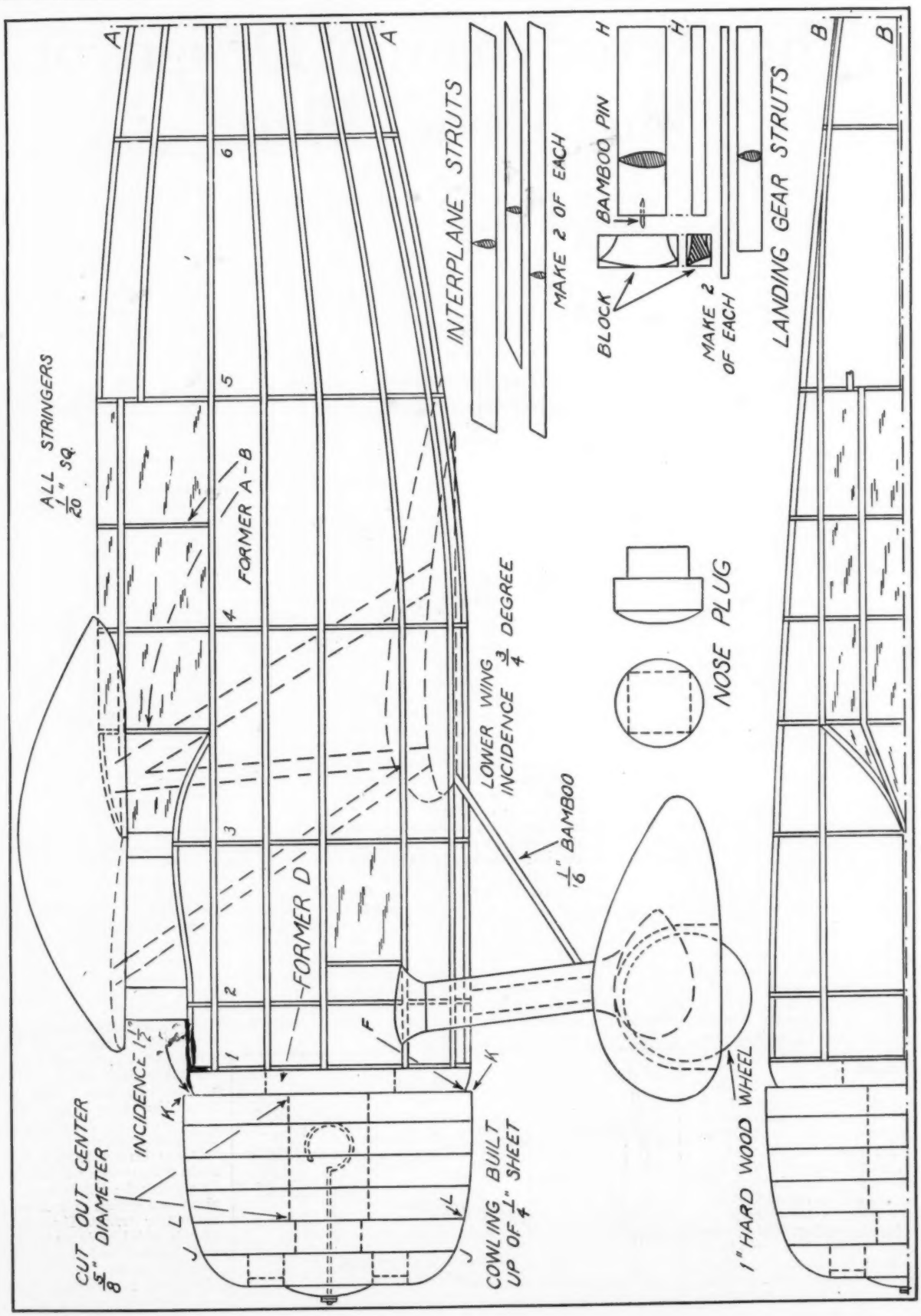
However, we have not considered the increase in weight of the wings or the tail surfaces. The weight of the wings and tail surfaces is approximately 30% of the model's total weight. If these have been built light in the first place it may be assumed that they will have to be increased in weight about 40%. This means that 12% of the weight of the original model is added. The landing gear will have to be made heavier too. If the weight of the landing gear is 12% of a model's weight and there is an increase of 40% in its weight, we get another increase of 5% in the weight of our multiple-motored plane. Thus we see that its weight has increased 50% plus 12% plus 5%, or 67%.

However, due to this added weight the torque of the motor will have to be increased at least 67% in order that the plane will fly properly. In order to increase the torque two-thirds over the eight-strand motor, 50% more strands will have to be added to each motor, for the torque (Q), equals $KS\sqrt{S}$, where (S) is the number of strands of rubber. This means that four more strands must be added to each of the two motors, which makes a total of eight strands added. Eight strands is equivalent to one motor used on the original model which in turn was 20% of the weight of the model. This will make it necessary to increase the weight of the model's structure to withstand the greater power. If the torque is 67% greater due to the eight strands added, the fuselage will have to be 67% stronger. If the weight increase is only 50% due to this, it will weigh 15% more. The increase in the weight of the rest of the structure due to the added rubber and fuselage weight will be at least 10% more. Thus we have added 15% + 10%, or 25% more weight, making a total of 92% greater weight.

Due to this added 25% weight again more strands will have to be added to the motors, actually about two strands to each motor or four strands. The weight of this added rubber plus the still greater weight of the structure required will provide 15% more for gravity to play

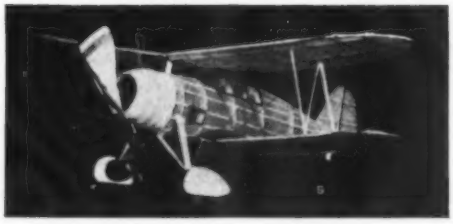
(Continued on page 41)




ALL STRINGERS 1/20" SQ
FORMER A-B
FORMER D
INTERPLANE STRUTS
MAKE 2 OF EACH
BAMBOO PIN
BLOCK
MAKE 2 OF EACH
LANDING GEAR STRUTS
LOWER WING INCIDENCE 3/4 DEGREE
1/16" BAMBOO
NOSE PLUG
CUT OUT CENTER 5/8" DIAMETER
INCIDENCE 1 1/2"
COWLING BUILT UP OF 1/4" SHEET
1" HARD WOOD WHEEL
A
A
B
B
H
H
F
K
L
J

Building a Flying Waco Cabin Model

Complete Data to Create One of the Finest Models Ever Presented to Builders



One of the best flying models ever built. A large propeller gives long flights

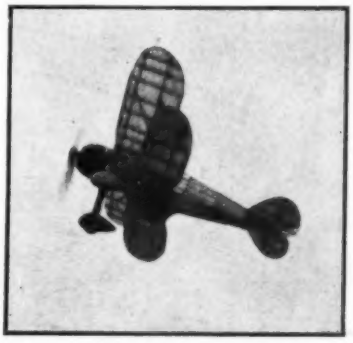
By WILLIAM WINTER and WALTER McBRIDE

THIS well-known ship has been made available in a variety of models, the most famous of which has been the export fighter. With the cockpits enclosed and with the Wright Whirlwind engine of 420 horsepower installed, it is possible for the private owner to have the very latest in high-performing planes.

The model is sturdily built and an effort has been made to secure an exceptional flyer not by weight reduction but because of a well-worked-out design. Though the speed is naturally fast, the job is perfectly stable and has a glide which will not continually be causing damage. This model, because of its graceful lines and interesting construction, will provide many hours of enjoyment both in its building and flying.

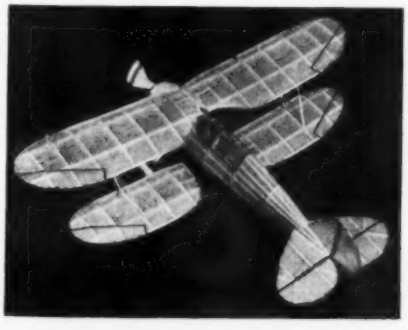
Fuselage

Using the patterns given, cut all the bulkheads with the exception of No. 7 from 1/32" sheet. Bulkhead 7 is laminated 1/16" sheet. Former D is cut from 3/16" sheet. Cut the main notches and mark the location of the auxiliary notches. As 1/16" sq. is too heavy, the stringers must be sanded to about 1/20" sq. before the actual construction is begun. The four main stringers are first cemented in place on the widest bulkheads. The severe bend on the side main stringers at No. 5 bulkhead can be retained by pressing the wood to shape. Draw the rear together and cement the remaining bulkheads in place. The auxiliary notches are cut when necessary as the work progresses, allowing for any irregularity in your work. The rudder post is 1/16" sq. and is cemented in position as shown on the side view. The enclosure formers A and B are attached. Glue former D flush to bulkhead No. 1. This former will absorb any stress and is suitable support for the cowling. The rear hook of .022 wire is bent to shape and inserted in No. 7 bulkhead as designated. A piece of 1/16"x1/8" is located at the rear of the fuselage to provide a sturdy tail-wheel installation.



The completed model in full flight, graceful and realistic

A fine climb and a steady flight characterize this little ship



It is not hard to build despite the fine details and its light weight

Using white superfine tissue, cover with narrow strips to avoid wrinkles. The finished covering may be lightly sprayed and doped. The cockpit enclosure and the small window near the front of the fuselage are of cellophane. Trim the windows and the edges of the enclosure with black lacquer or dope.

Wing Fillet

The fillets are cut one left and one right hand from soft balsa. Their size and shape are given in detail and are shown on the front and side views. Smooth with fine sandpaper and attach at the position shown on the plan. In building the original, a mixture of cement and fine balsa sawdust was used to fill crevices so that smooth flowing lines would result. Lightly sand and paint with black lacquer.

Landing Gear and Tail Wheel Assembly

The main struts are cut to size from a piece of 1/8"x3/8" and streamlined. The small block that is attached to the fuselage is shaped as shown in detail and is fastened to the strut with cement and a bamboo pin. The inner struts are of 3/32"x3/16" and are attached to the middle of the fuselage at No. 2 bulkhead. This is clearly shown on the front and side views. The rear strut is of 1/16" bamboo. It is inserted in the wing fillet as shown.

The pants are built up of three sections similar to the shape shown on the side view. The center piece is 3/8" thick and is cut out to receive the wheels. The side pieces are 1/16" sheet and are glued to the middle section. When dry the pants are streamlined and sanded. The fillets are shaped as shown in detail and are cemented to the inner sides of the finished pants as seen on the front view. The hard wood wheels are located on short axles of .022 wire. The completed units are attached to main struts with cement and bamboo pins.

Streamline a small piece of 5/16" balsa for the tail-wheel mount and attach to the fuselage as shown. The 3/8" tail wheel is mounted with .014 wire as detailed.

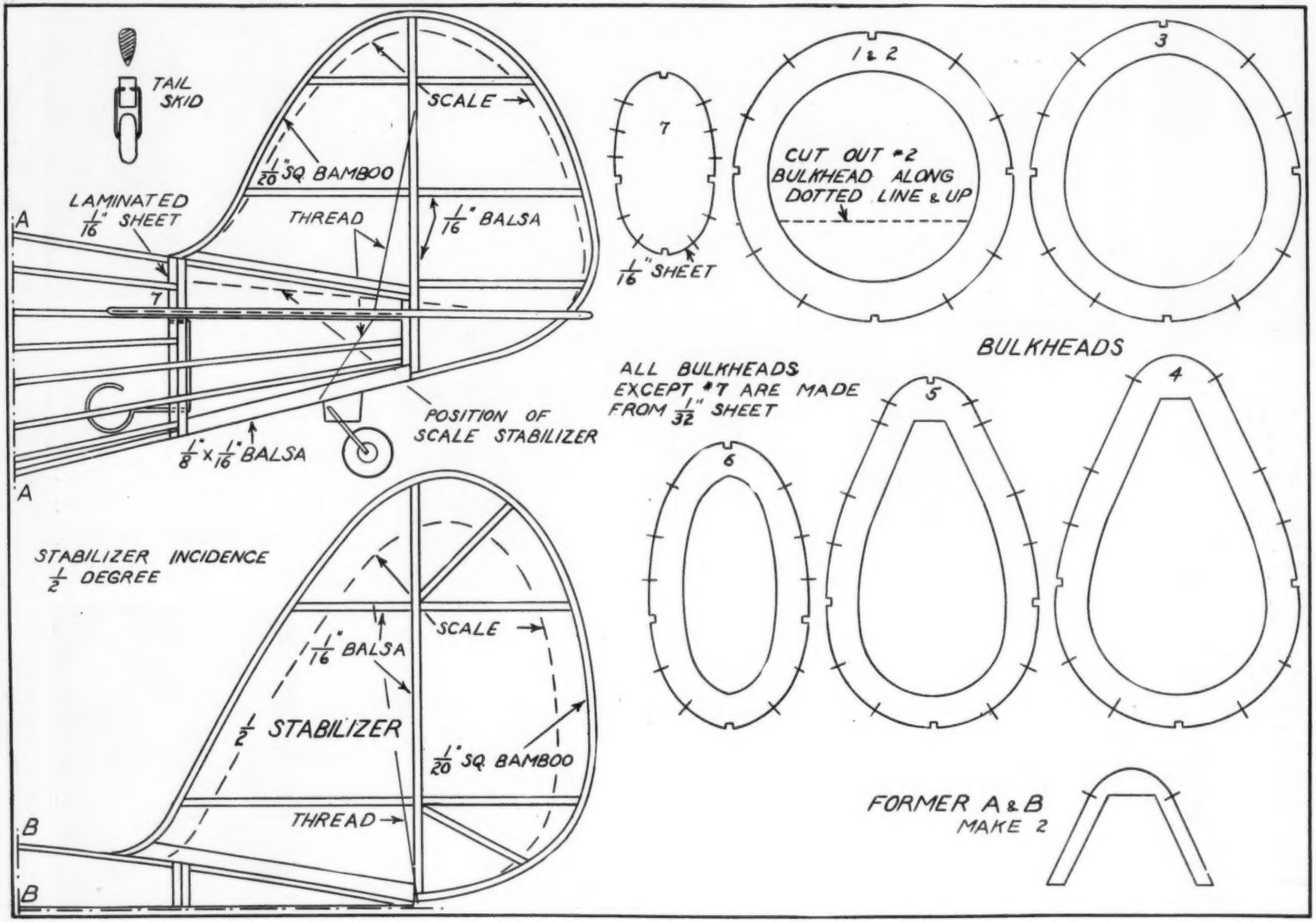
Tail Assembly

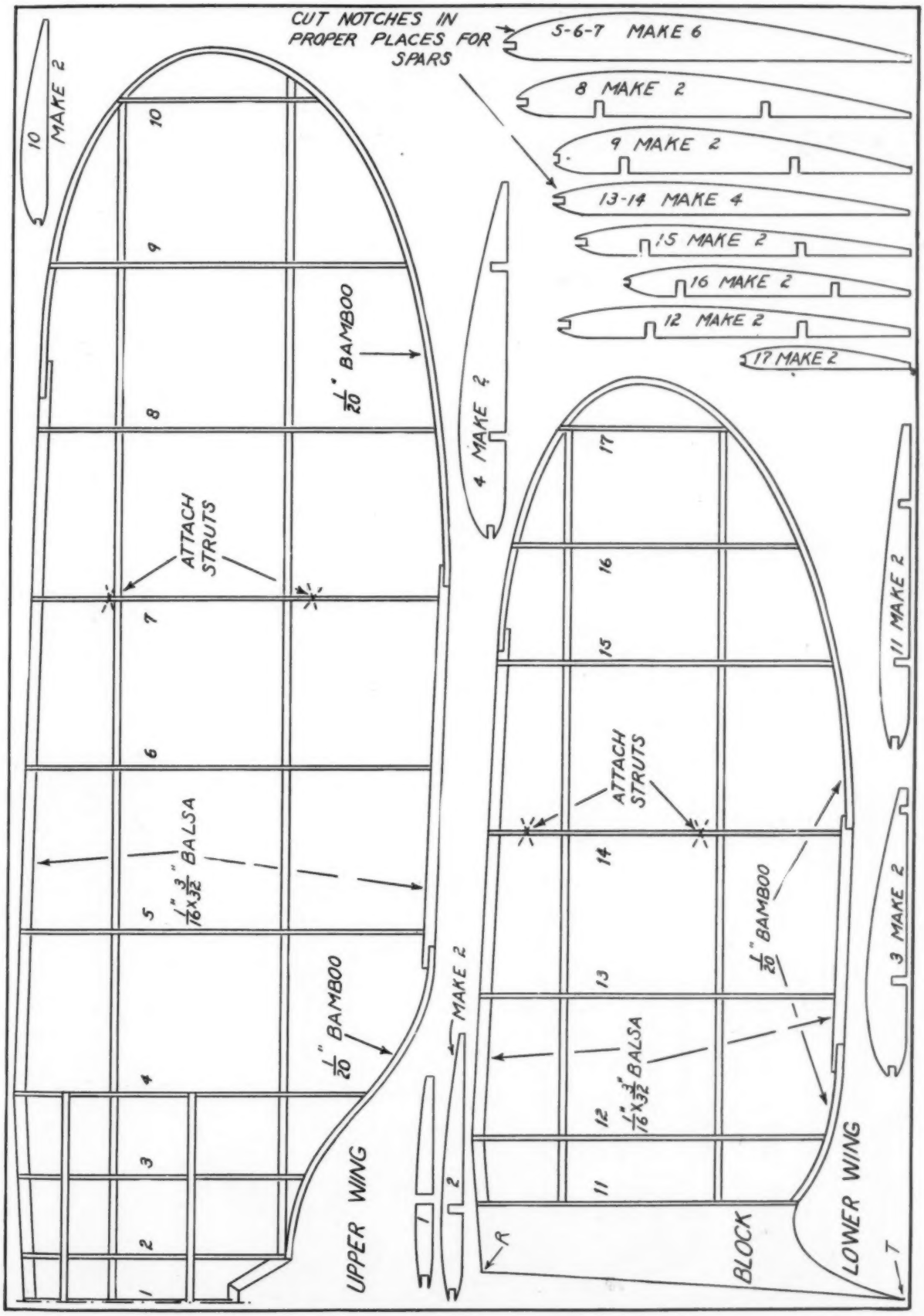
Pin the spars of 1/16" sq. to the bench and cement all crosspieces in place. The inner crosspiece of the stabilizer is of 1/16"x 1/8". The bamboo edges are split to 1/20" sq. and bent by candle flame to the required shape.

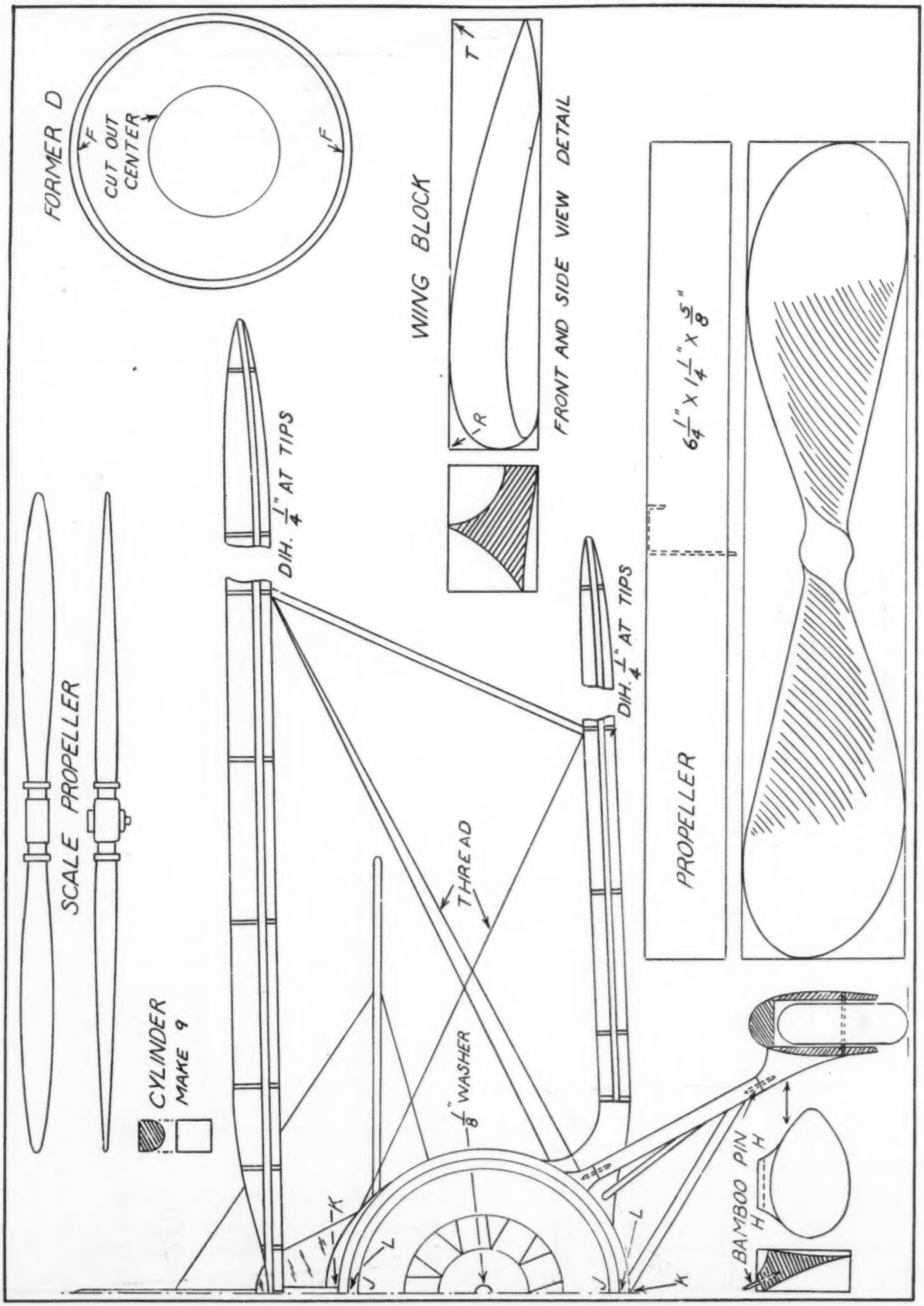
Cover each side of both stabilizer and

(Continued on page 44)

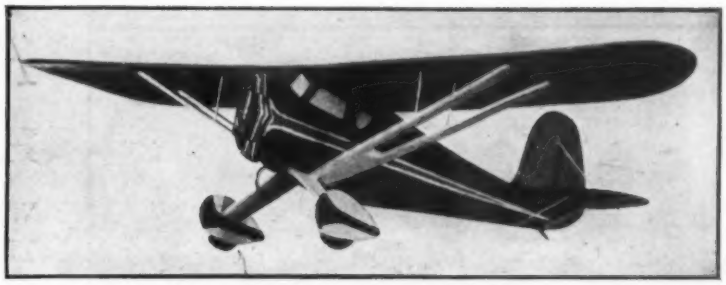
The nose plug pulls out to facilitate winding with a winder


TAIL SKID
SCALE
1/20" SQ BAMBOO
LAMINATED 1/16" SHEET
THREAD
1/16" BALSA
A
7
POSITION OF SCALE STABILIZER
1/8" x 1/16" BALSA
A
STABILIZER INCIDENCE 1/2 DEGREE
SCALE
1/16" BALSA
1/2 STABILIZER
1/20" SQ BAMBOO
THREAD
B
B
7
1/16" SHEET
1 & 2
CUT OUT #2 BULKHEAD ALONG DOTTED LINE & UP
3
BULKHEADS
ALL BULKHEADS EXCEPT #7 ARE MADE FROM 1/32" SHEET
6
5
4
FORMER A & B
MAKE 2


CUT NOTCHES IN PROPER PLACES FOR SPARS
5-6-7 MAKE 6
8 MAKE 2
9 MAKE 2
13-14 MAKE 4
15 MAKE 2
16 MAKE 2
12 MAKE 2
17 MAKE 2
10 MAKE 2
4 MAKE 2
11 MAKE 2
3 MAKE 2
1/20" BAMBOO
ATTACH STRUTS
1/16"X3/32" BALSA
MAKE 2
UPPER WING
LOWER WING
BLOCK
R
T


FORMER D
F
CUT OUT CENTER
F
WING BLOCK
T
R
FRONT AND SIDE VIEW DETAIL
DIH. 1/4" AT TIPS
DIH. 1/4" AT TIPS
6 1/4" X 1 1/4" X 5/8"
PROPELLER
SCALE PROPELLER
CYLINDER MAKE 9
THREAD
1/8" WASHER
BAMBOO PIN
H
H
K
K
L
L
J
J

A Silhouette Monocoupe Glider



The little glider ready to fly is very realistic in appearance

A Beautiful-Looking Flying Scale Glider That Can Be Made Easily by Anyone from Scrap Wood

By JESSE DAVIDSON

HERE is a little model that everyone will want to build. It is the plane that Lindbergh recently selected for his private use. The best part of our story is that this miniature flying Monocoupe is very simple to make; just a few pieces of flat scrap wood and a little cement and paint are all that is necessary.

It is designed just like the big ship and will glide, loop, and perform various other maneuvers like its big brothers. Built to a scale of 3/16" equals one foot, the same as the other models of this type presented in various issues, it makes another attractive unit for your airport.

Here are some of the outstanding characteristics of the full scale Monocoupe that may interest you before you actually start to construct this little model. Its cost of operation is lower than that of the average small car. It has a top speed of 135 m.p.h., cruises at 115 m.p.h. and lands at 40 miles. It uses less than five gallons of gas an hour. The Monocoupe is equipped with wing flaps, steel prop, controlled ventilation and several other new features not found in any other type of ship of the same power and price. Now you are ready to start construction.

All parts shown in the plan are indicated by letters and are listed below with their respective dimensions:

A. Wing, 1/32"x15/16"x6"
B. Fuselage, 3/32"x13/16"x3 5/16"
C. Elevator, 1/32"x11/16"x1 25/32"
D. Rudder, 1/32"x15/16"x13/16"
E. Wheel pants (two pieces), 1/16"x3/8"x 11/16"
F. Landing gear struts (two pieces), 1/16"x 1/4"x14/32"
G. Wire launching hook
H. Lift struts (two needed), 1/16"x1/2/x 1 7/8"
I. Wing rib (two pieces), 1/32"x1/16"x7/8"
J. Wing brace struts (four pieces), 1/32" sq. x 5/16" bamboo
K. Stabilizer braces (two pieces) 1/32" sq. x 5/8" bamboo
L. Stabilizer braces (four pieces), 1/32" sq. x 1/2" bamboo
M. Propeller, 1/16"x1/8"x 1 1/4"
N. Tail skid (strip of bamboo)
O. Position for stabilizer
P. Position for nose weight
LE. Leading edge of wing

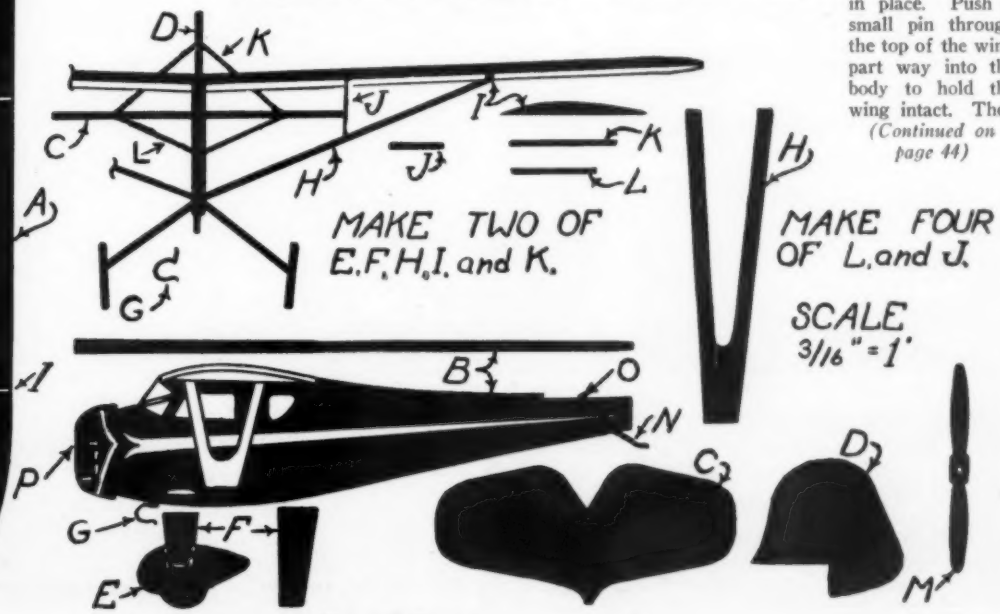
The patterns of the wings, side view of the fuselage, rudder, elevator, wheel pants, wing struts, landing struts, and wing ribs are the main parts of the model. These are shown in black. The patterns may be cut out from this page to have their outlines traced onto the wood or you may use tracing paper to transfer the outlines. The latter method is urged if you do not wish to mutilate the page.

Cut out all parts right on the line. The cabin windows are left in white and the window frames outlined.

The wing, of course, must first be cambered. Hold it above a steaming kettle or flame to get the desired shape. Next cement a wing rib, letter I, underneath the curved piece at each point designated by a series of dotted lines at the outer edge of the wing tips. Crack the wing slightly and bend each tip upward to a dihedral angle measuring 1/8". Apply cement along the crack on both surfaces of the wing.

The shape of the wheel pants and wheel are cut out in one piece. In rigging the landing gear to the fuselage sides, first cement the struts, letter F, to each side of the body with a tread measuring 1 1/16". Next cement the wheel pants in the position shown. A small pin will hold these pieces in place until the cement has dried. The stabilizer is cemented in position, letter O. The rudder is cemented directly above it. The wing is next to be cemented in place. Push a small pin through the top of the wing part way into the body to hold the wing intact. Then

(Continued on page 44)



AIR WAYS

HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments

Pict. No. 1. Scale Goshawk by Alfred Vradenburg

THE 1935 National Model Airplane Contest has just set another glaring page in the history of model aviation. We do not wish to take the space to tell you the details here in the Air Ways column and duplicate them inasmuch as they are covered completely in the National Aeronautic Association section of the magazine. The Contest was held in St. Louis which made it impossible for many model builders to attend. These have continued their activity, however, in their own workshops and we take pride this month in presenting pictures of some very unusual models and events which have come to us.

Picture No. 1, at the head of the page, is the finest model picture to have been received this month. It is a Curtiss Goshawk complete in detail, made from a kit, by Alfred Vradenburg of 9001 Keith Ave., West Hollywood, Calif., who deserves a great deal of credit for turning out a model embodying such excellent workmanship.

Look at picture No. 2. Is it a photograph of a real ship "coming in" or just a model? It is one of the most realistic "action" model pictures we have received. It is a model Waco in full flight, built by Andrew Mednansky of 216 East Twenty-fifth St., Chicago Heights, Ill. The ship has a span of thirty inches.

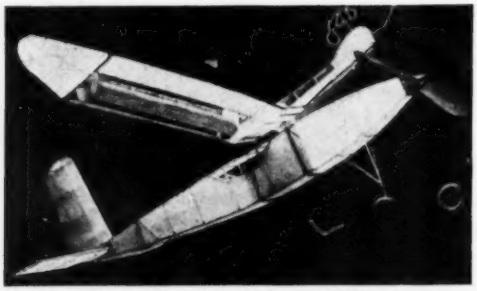
Here is a new "wrinkle." Gerard L. Smith of 398 Seventh Ave., Brooklyn, N. Y., has recently been experimenting with hydro model airplanes of the gas motor variety. To Gerard, as far as we know, goes the distinction of obtaining the first successful flight with a gasoline-powered model hydro-airplane. Picture No. 3 shows Smith with his very young helper and his gas job during one of its test flights. He says:

"The ship hops off in about twelve seconds. The most important thing in this type of model is to secure the proper alignment of the floats, relative to the line of thrust and center of gravity. After four adjustments she hopped up on the step and took off. No words could explain the swell landing. The motor stopped when she was about 400 feet high, there was a slight stall after the motor stopped but she dampened out of it before she landed. As she was landing (three feet from the water and with the wind) we were all on 'pins and needles.' This ship hit the water with a slight bounce and a splash, but remained upright in its normal flying position. We all breathed a sigh of relief as we saw her sitting on the water 'as sweet as a duck.'"

For all model fans who have worn out all the model thrills we suggest that they try their hand at this type of ship. It should be very exciting to say the least. Smith adds, "At least, hydros seldom break their propellers."

James McPheat, Jr., of 4033 Seventy-sixth St., Jackson Heights, N. Y., has the true spirit of the inventor. There is nothing he likes better than to experiment with models which are not

Pict. No. 3. Gerard Smith and his hydro-gas model, the first successful one



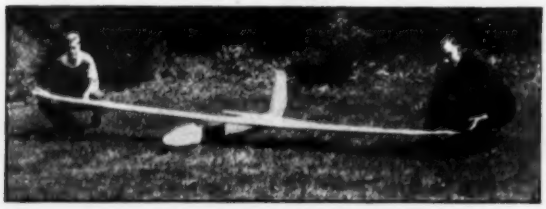
Pict. No. 4. An ingenious and successful rotor wing plane built by James McPheat, Jr.

Pict. No. 2. This is really a model Waco in flight built by Andrew Mednansky

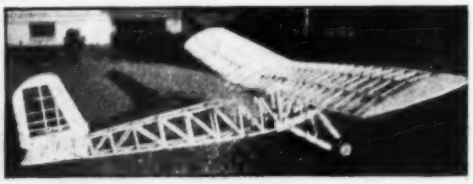
Pict. No. 5. A K.G.-3, by Bob Scarborough

Pict. No. 13. A hydro glider by Joe Axisa

Pict. No. 7. A scale Boeing F4B-4 gas model built by K. A. Pouch



Pict. No. 6. Ted Tefft and "Doc" Wetherbee and their 15-ft. glider



Pict. No. 8. A K.G.-3 before covering, by Art Morcello

of the "common variety." Picture No. 4 shows you what he has been doing lately. It is a rotor wing model. In the picture the rotor may be seen to be running through the center of the wings. The unusual thing about this experiment is that it operates successfully. It has flown over one hundred feet in tests at Holmes Airport, and recently the plane won an originality contest held at Valley Stream, N. Y. The rotors each are twelve inches long and revolve freely in the air-flow over the wing. The 12-inch propeller is driven by twenty strands of ⅛" flat rubber. McPheat tells us that originally this ship was a Gordon Light tractor. Though this is hard to believe we must take his word for it. In model airplane building when a dreamy inventor starts to build his plane there is no telling what his final result will be. New wings, tail, and landing gear to the Light tractor produced the unusual ship shown here.

Pict. No. 9. A magnifying glass is required to look at this model, a 6½" Fokker D8 by Wm. Heermance

Bob Scarborough of Buffalo, S.C., wins the distinction of being the first one to send a picture in to Air Ways showing his 8-foot gasoline-powered model built from the plans given in the April and May issues of Model Airplane News. It is shown in picture No. 5. This model is the K.G.-3. It has an 8-foot wingspread and Scarborough tells us that it is an excellent flier, the guiding angle being approximately twelve to one. The ship weighs approximately five and a half pounds. This ship, with 10-foot wings instead of eight, is the one with which Joe Kovel established two world's records with a flight of 64 minutes, 40 seconds at the Eastern States Model Plane Contest. We will be glad to hear more about flights of this model from any young men who have built it from the plans in the magazine.

Gliders are growing. Picture No. 6 shows a 14-foot, 8-inch glider built by Arthur Wetherbee and Ted Tefft of 245 Martine Ave., White Plains, New York. They say:

"This is not a rival of the Maxim Gorky, but is merely a model glider which we built to exhibit. Some day we may attempt to fly it. It owes its creation to a dare between the builders.

"We dared each other to build it and finally decided to build it together. Actually this model is a Darmstadt glider. It was made from very small drawings which were scaled up to proper size."

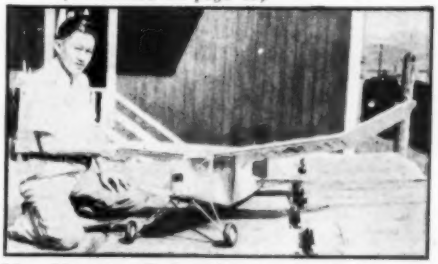
We are sure readers will be interested to hear something about the flights made with this ship.

The advent of the gasoline-powered model is invaluable to model builders. When this type of power is used builders are able to create models of more exact scale proportions. This is due to the fact that the weights are placed in the ship in approximately the same positions as in the large plane and that the inertias are proportionately the same. For safety's and stability's sake, however, it is usually necessary to enlarge the tail surfaces slightly. Picture No. 7 illustrates clearly what we say here. It is a picture of a 68-inch span, 1/5-horsepower, gas-motor driven scale Boeing F4B-4 Navy Fighter, built by

(Continued on page 45)

Pict. No. 14. Boys are air-minded in Czechoslovakia. A model exhibit in Prague. Courtesy of Arnost Klein

Pict. No. 15. A model exhibit of the Lawrence, Mass. Model Club. Joseph Finn is Commander

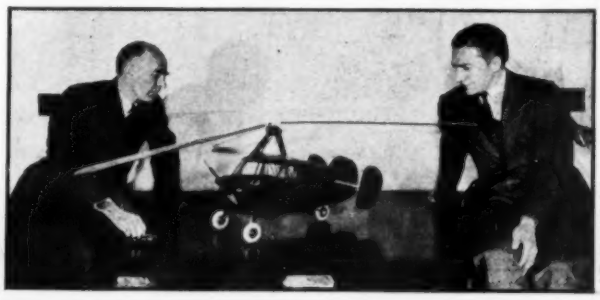


Pict. No. 11. Bert Takemoto has built this "gas" job in far-off Honolulu. It flies well

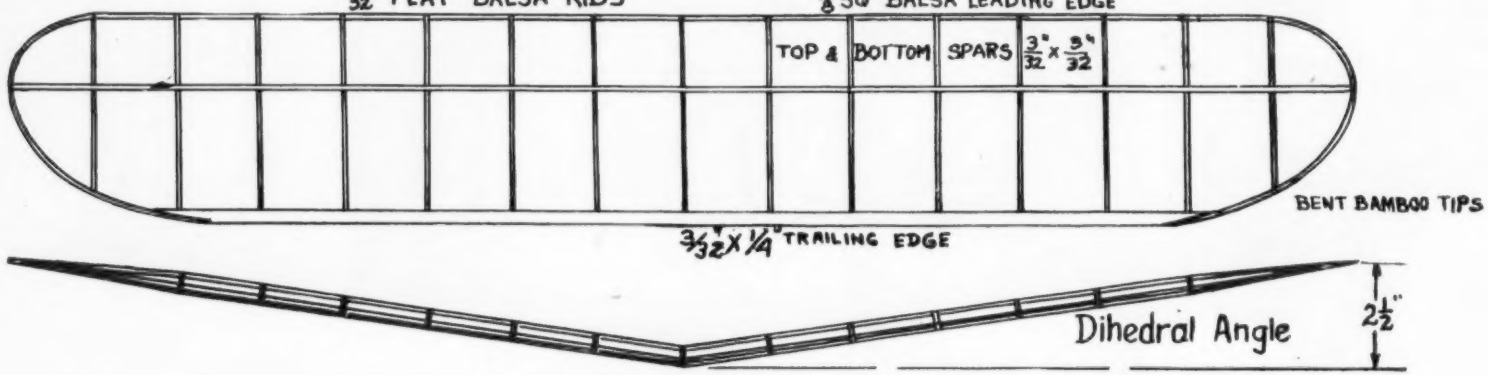
Pict. No. 12. Here is a model biplane in flight; built by Russian aviation students

Pict. No. 17. Contestants and their models at the first "gas" model contest in California

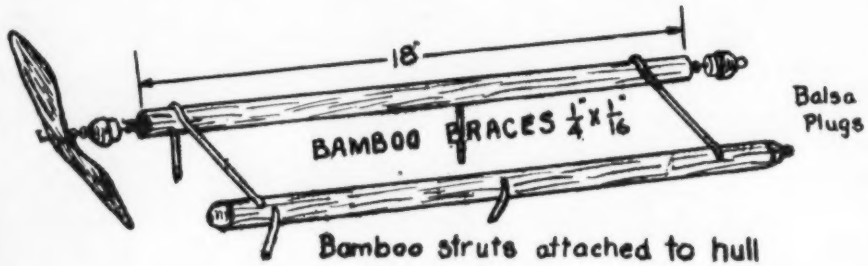
Pict. No. 16. Winners in the Conn. Model Airplane Contest. Ira Baldwin (right) won the M.A.N. trophy



Pict. No. 10. Mr. Geisse and Mr. Vidal (left to right) examine a model of the new "flivver" autogiro

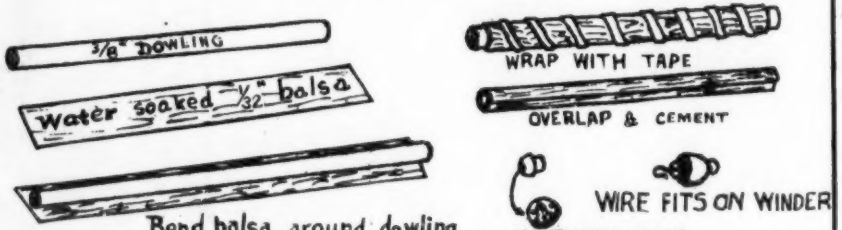


MAIN WING SCALE 1/4" - 1"

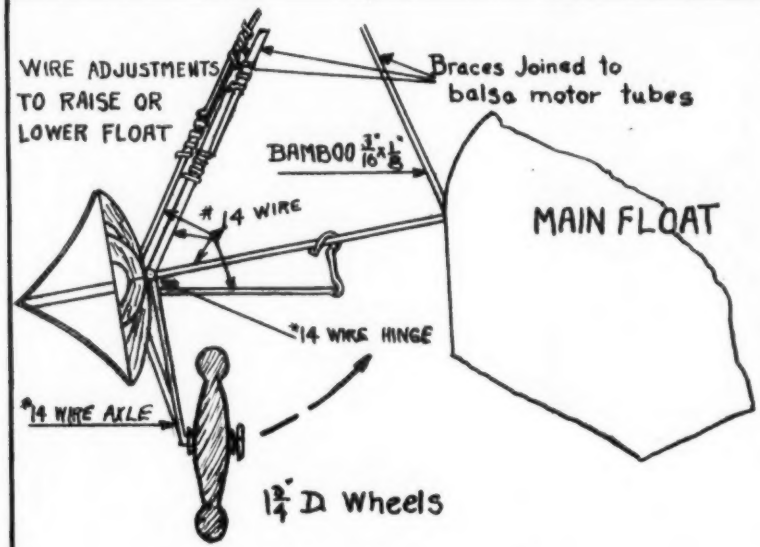


Bamboo struts attached to hull

BALSA MOTOR TUBES



MAKING THE MOTOR TUBES (MAKE TWO)



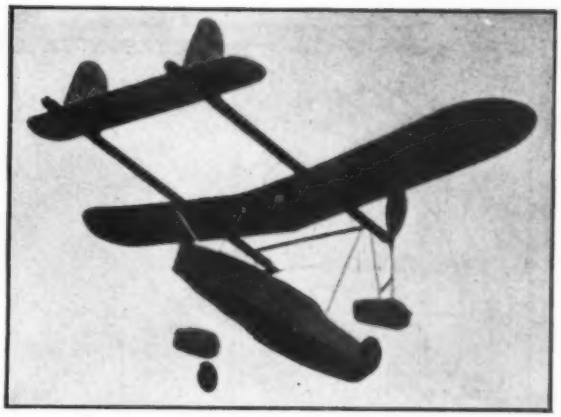
Method of attaching side floats
Not drawn to scale

C.S.L

How to Build a Twin Amphibian

A Unique High Performance Model with Landing Gear That May Be Changed for a Land or Water Take-Off in One Minute

By GORDON LIGHT and ALAN BOOTON



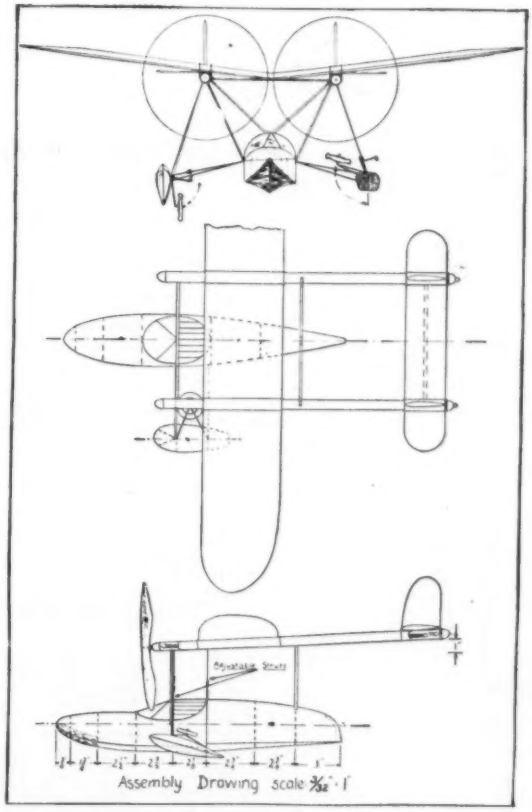
A practical combination land and water plane that gives remarkable performance

TRANSATLANTIC air lines in the near future are a certainty. Model aviation should be prepared for this newest step in flying, so here is a model amphibian that is capable of flying passengers and mail over any "model" ocean air line. This amphibian takes off quite easily from land or water and the average flight of about 50 seconds is packed with thrills.

The most difficult part of designing this model was to make it take off water. I began experimenting last fall but cold weather called a halt for all water take-offs. However, Alan Booton, whose "Helpful Hints for Model Builders" are familiar to all readers of MODEL AIRPLANE NEWS, continued the experiments. Taking advantage of the warm Florida sunshine, he was able to iron out all the kinks, so now the model is a sure-fire performer. Careful designing of the main float assures you a quick water take-off. There is no better model to take along on your vacation. It will never fail to give a thrilling performance whether it is on "land or sea."

Let's get started, it really isn't hard to build. The materials we'll need are:

Sheet balsa, 1/32", 1/64" and 1/16" thicknesses for ribs, formers, float covering, etc.
1 pr. of 1¾" wheels.
2 propeller blocks 1"x1⅛"x8".
⅛" sq. balsa for the leading edge and wing spars.
⅛"x¼" balsa trailing edge.
1/16" sq. balsa—float longerons, elevator.
Small balsa blocks for nose plugs.
Bamboo for motor tube supports.
One 18" piece of ½" doweling, any kind of wood, to be used for forming motor tubes.
No. 14 wire, dope, varnish, clothing snaps, cement, etc.



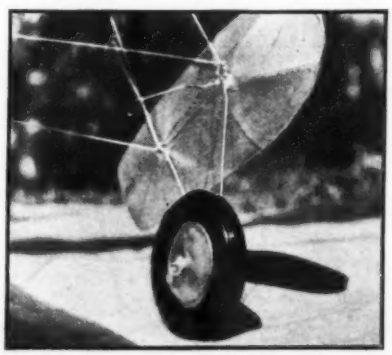
Main Float

Start by building the main float. Cut the formers from 1/16" sheet balsa. The longerons of the float are 1/16" square balsa. Build the float framework just as you would build any fuselage model. Cement seven bamboo stringers to the top of the hull. Note the curve in the bottom of the hull. The bottom juts out into a point just in front of the step. The bottom is a flat "V," the sides of the "V" being concave. These two features are essential in breaking the suction of the water during the take-off. The rear end of the hull is a solid piece of balsa wood cut to the shape in the drawing. The piece is former "H" in the drawing. Former "A" at the front of the hull should be fitted in place after the other parts of the float have been completed. Reinforce formers "D" and "E" with small pieces of balsa along the side where the small floats are attached.

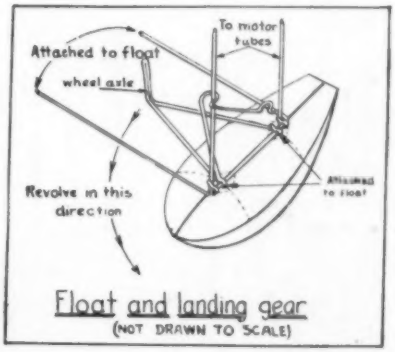
Finish the skeleton framework of the hull, then cover the bottom and the sides with 1/32" flat balsa. Covering a framework with sheet balsa is a tedious process at best and the only helpful advice we can give is: use anything—pins, rubber bands, weights, etc.—that will keep the balsa in shape while the cement dries. Cover the top with tissue as there is little danger of leakage there, but don't cover the top of the float until later as it will be necessary to reach inside the hull to attach the small floats.

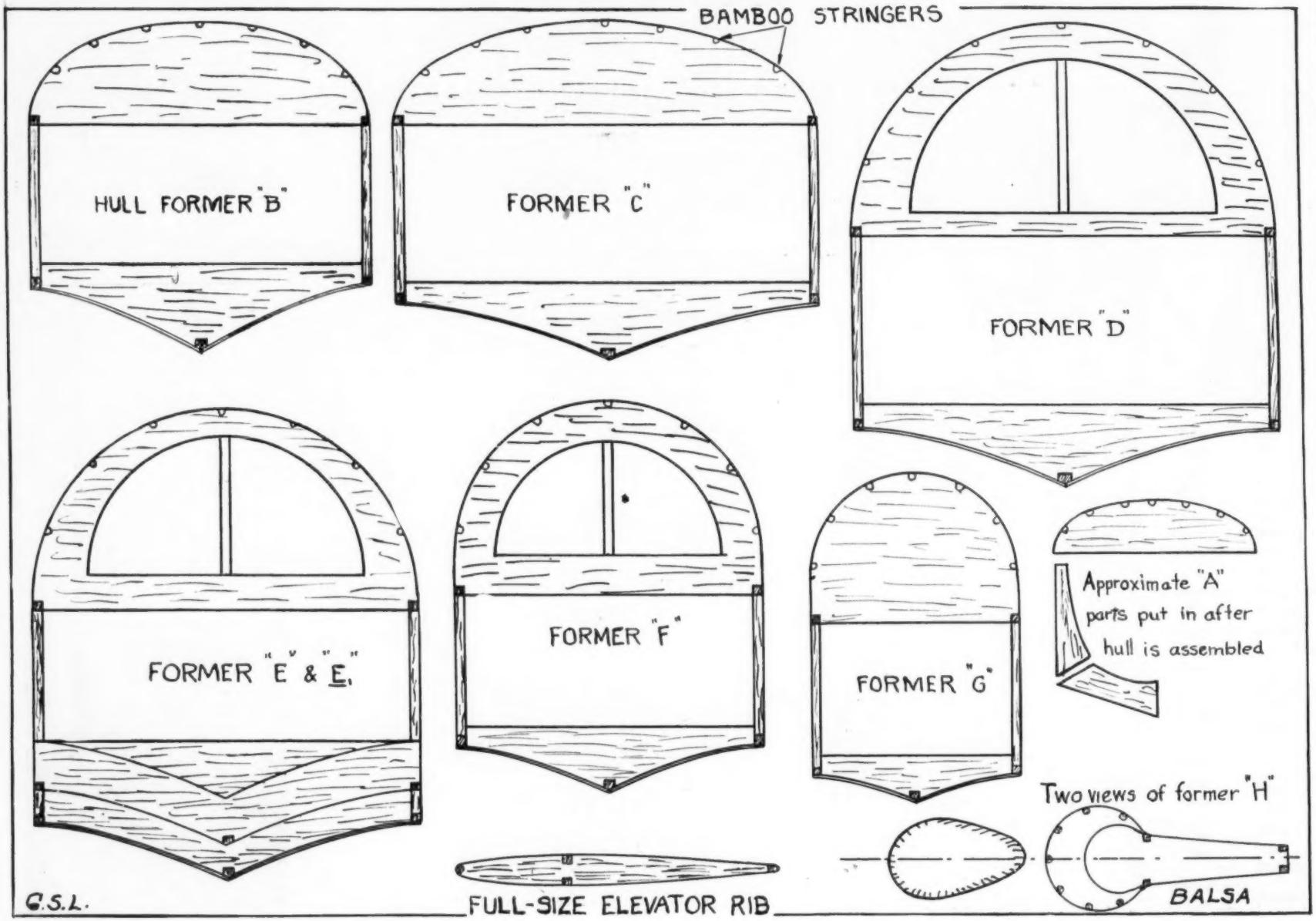
The two small floats are made the same way as the main float. Cut the formers from 1/16" balsa and assemble the framework. Cover the floats with 1/64" flat balsa. The thinner the wood the more easily it is bent around the sharp curves of the small float. On the top, reinforce the formers with balsa as you did in the main float. Before attaching the side floats,

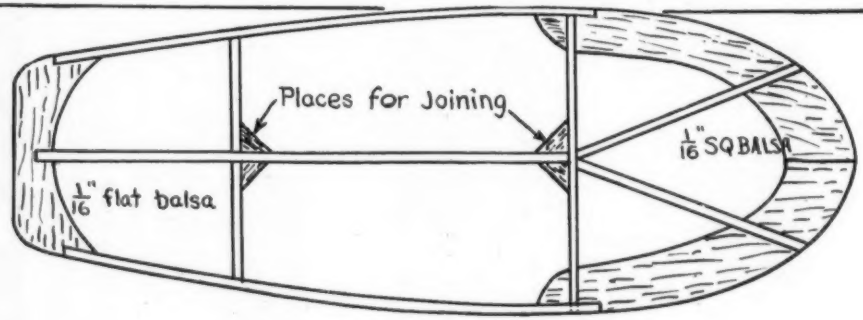
(Continued on page 38)

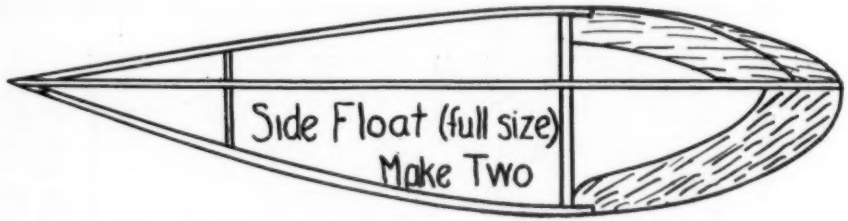


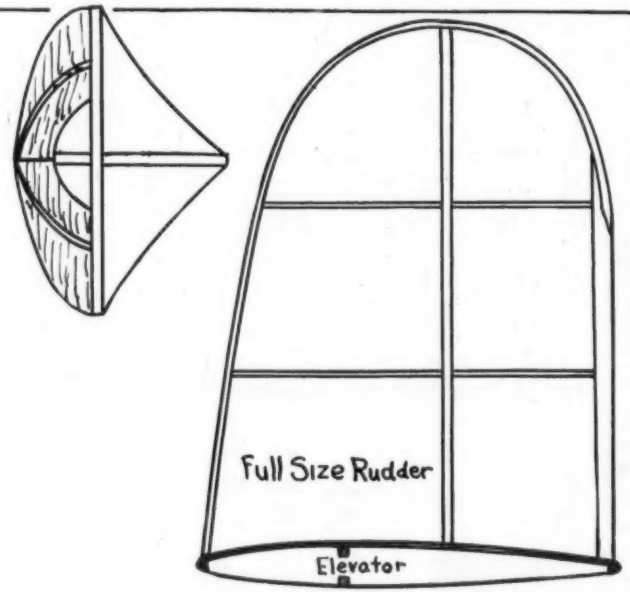
Easily changed to wheel or float

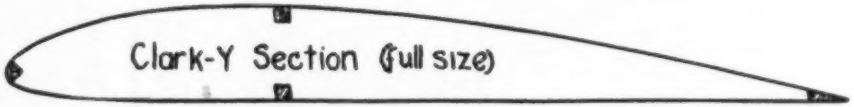



BAMBOO STRINGERS
HULL FORMER "B"
FORMER "C"
FORMER "D"
FORMER "E" & "E1"
FORMER "F"
FORMER "G"
Approximate "A" parts put in after hull is assembled
Two views of former "H"
BALSA
FULL-SIZE ELEVATOR RIB
C.S.L.

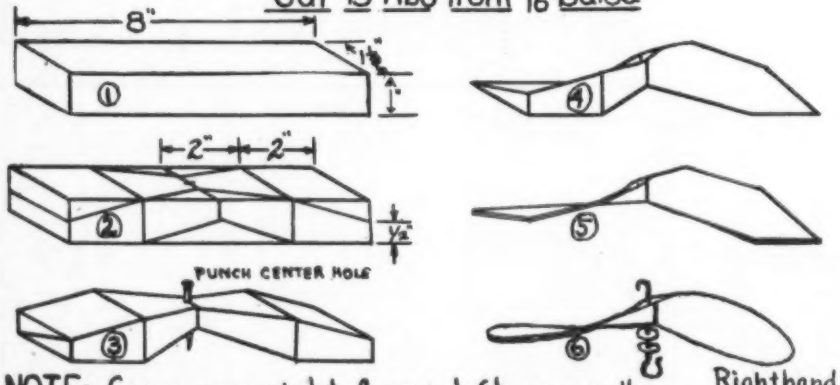








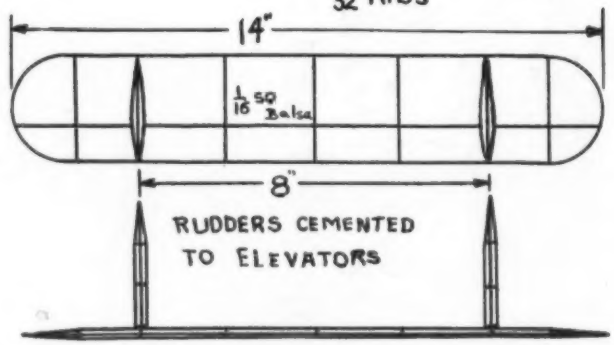
Cut 15 ribs from 1/16" balsa



NOTE: Carve one right & one left propeller

Righthand prop.

1/32" Ribs



ELEVATOR OUTLINE 1/4" = 1"

G.S.L.

FORMATIONS! The Newest Craze Among Modelmakers!

Boy, oh boy! You've just never seen anything as sweet as these two—they're beautiful giant size Dwarfs—and flying models, of course, as are all C-D Kits and the new C-D controls will please the most critical. Yes, Cleveland has done it again—for these really are spectacular—but when so many of you modelbuilders kept besieging us for them, what else could we do but get them ready for you with full speed. And the biggest surprise of all is the low price at which you're able to procure these—only $2.50 a piece. Think of it. And absolutely complete, except for liquids and striping tape (no Dwarfs are ever supplied with either of those, you know). Outside of telling you that the Boeing 247 has a span of 37", a length of 25⅝" and suggested coloring all dark gray, and the Martin Bomber Kit D-45 has a span of 35⅝", length 22⅛", to be colored the usual yellow and olive drab of the U. S. Army, all I can say is that they are the slickest models any enthusiast ever laid eyes on AND YOU CAN BELIEVE ME. *MODELIN' BILL.*

Don't forget, each "dry" Kit D-35 or D-45 (no liquids) only.... $2.50

HERE'S THE "DOPE" ON LIQUIDS

Since all Dwarfs are absolutely complete, except for liquids and striping tape, you may wish to purchase liquids along with your Kit in the event you do not have the particular ones necessary for that design. Generally speaking, if one has a fair amount of experience, ¼ oz. of wood and paper cement will probably be sufficient for assembling the entire model. The larger models (not 35 or 45), of course, or for those not having much experience, we would recommend 1 oz. of each be ordered, except for models priced at 35c or less. For the colored dopes of the fine quality of Cleveland dopes, ½ oz. of each color is sufficient to give one good coat at least, and on models such as the 15" Fury, 1 oz. of silver will go farther than one would expect for the entire job. For the larger models, the two or three main colors (usually mentioned first) should be purchased in 1 oz. quantities, but even on these larger models, using care, ½ oz. will easily give you at least one good coat. If you wish to build up a little reserve stock, 2 oz. sizes of all liquids necessary might be ordered. For 35 and 45 designs 2 ozs. of all necessary liquids required but use 4 ozs. gray for 35. Of course, for perfect color division or striping, striping tape should also be ordered. This is only 5c per card.

Cleveland's High Quality Dopes and Cements

Balsa Wood Cement	Light Blue
Clear Gloss	Light Yellow
Paper Cement	Silver
Anti-Blush Thinner	Military Yellow
Clear	International Orange
Diana Cream	Army Olive Drab
Grass Green	Havana Brown
Fire Chief Red	Glossy Black
Medium Blue	Dark Gray
Glistening White	Very light Gray
Light Green	Metallic Black

Prices ½ oz. 6c, 1 oz. 10c, 2 oz. 18c plus packing charges of 15c PER ORDER, the same as for any parts order over and above the Dwarf packing charge necessary. For jobs requiring gold, Laird Gold, Wedell Wms. Gold and Seversky Copper Bronze at 5c per envelope available, sufficient for 1 oz. of clear dope. Use within three days after mixing.

DEALERS! SCHOOLS AND CLUBS!

Boys and men will be calling on you for these Kits. Be sure to stock them.

See Our Ad on Back Cover

21 More Reasons Why C-D's Are Supreme

GB SUPERSPORTSTER

Doolittle's 1932 Thompson winner—and a beauty. Fast flights. Span 12⅛", length 9". Suggested coloring: white, red, scalloping. Kit D-27..... **50c**

GREAT LAKES SPORT TRAINER

One of the prettiest models available. Easy to build. Excellent flights. Includes Cleveland's latest features and loads of details. Span 13¾", length 10⅛". Suggested coloring: orange & cream, Kit D-1G..... **65c**

LOCKHEED VEGA

A picture for beauty—a wonder for flights. Span 20½", length 14". Suggested coloring: brilliant red and cream. Kit D-24..... **85c**

WACO C-3

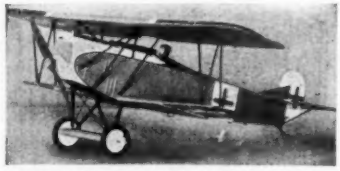
Very popular cabin plane. Span 16½", length 12¾". Suggested coloring: silver and red. Kit D-37..... **75c**

BOEING 95 MAIL

Easy for beginners. Redesigned for beauty and even greater duration than ever before. Span 22 3/16", length 16". Suggested coloring: blue and silver. Kit D-32B **85c**

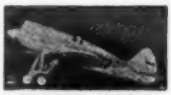
ROSCOE TURNER'S WEDELL-WILLIAMS

Another ship needing no introduction since our beloved Col. Roscoe controls it wherever she goes. The '34 Thompson Trophy winner. Fast flying model. Suggested coloring: Wedell-Williams gold. Has a span of 13", length 11". Kit D-48, postfree..... **50c**



FAMOUS WARTIME FOKKER D-7

A really authentic steady flying beauty so realistic that it looks as though it was drawn right from the ranks of one of the famous German "Flying Circuses." Wings taper beautifully, new feature control movements (not from cockpit), scale propeller, authentic spandau guns (you make all). Suggested coloring: international orange, green, white, black details. Span 14¼", length 11¼" Kit No. 8F-15B..... **60c**



HOWARD "PETE"

An easy-to-build Air Race model—fine flights. Span 10", length 8⅝". Suggested coloring: all white, black details. Kit D-18B.... **30c**

IMPORTANT If your dealer can't supply you—order direct, stating you add 10c to the price of each Kit to cover mailing and there is no packing charge necessary. Customers in Canada, Mexico, British service charge. All other countries 20% extra. For a catalog, 5c stamps or equivalent when only 5c silver pieces are acceptable. The No. 17 catalog for 5c in stamps or Christmas catalog later in the year, so this is really a "2 for 1" ...

CLEVELAND MODEL & SUPPLY CO., 1866NJ West 57th St., Cleveland

rs! Startlingly Realistic with "Dwarfs"—and so Inexpensive!

Excitement High Over This New Phase of Modelbuilding—Make "Vee's," "V of V's," "Echelons," "Follow the Leader," Etc.!

Most modelbuilders have always yearned to see a realistic formation of Authentic C-D fighting models. But the expense of building enough of the same model to make a formation was too great—until "Dwarfs" appeared. bling, doping and whatnot, to say nothing of the excellent practice it gives you as an expert modelbuilder to continually improve your methods and a big saving in the purchases of larger sizes of liquids. Take for in-

Here was embodied all the authentic realism necessary, for "Dwarfs" are perfect ½" miniatures—and at ridiculously low prices. Presto! Formation building immediately began to sweep the country. Picture, for instance, how imposing a sight the fleet of nine P6-E's or F11C-2's would look on display in your school auditorium on certain occasions, rigged up in perfect formation flight, flying across in front of the auditorium stage suspended by silk threads or wires, with a card displaying your name as builder and owner of the fleet. Or, imagine a right echelon of nine P-26's displayed in your public library or in some very prominent and conspicuous spot in a public or business building in your city, and the name you can make for yourself as the outstanding modelbuilder in your town. Have these fleets of Army and Navy U. S. and foreign planes ready for display any time anyone needs them, not only for personal pleasure, but in many cases for profit. These displays are often asked for by merchants because of their offering such a uniquely different atmosphere. Even though you don't make them for profit or for display outside, just think what a stirring picture one of these fleets would make in your own home, possibly within your own room flying, for instance, in a tight "V" formation. And the building of nine of the same type ships all at the same time requires considerably smaller amount of time per plane for building, assemstance, nine Dwarf kits of Boeing P12-E at 65c would cost only $5.85; nine Hawker Fury Kits at 45c would cost only $4.05; nine Curtiss Hawk P6-E Kits (or F11C-2's) at 75c would cost only $6.75; nine Boeing P-26 Kits at 65c would cost only $5.85; nine F4B-3 or F4B-4 Kits at 65c would cost only $5.85; nine Vought Corsair Kits at 85c would cost only $7.65; nine Douglas 0-38 Kits at 85c would cost only $7.65. These Kits are all complete *except for liquids and striping tape.* Then, too, you may build formations of only 3 or 6 planes, if you wish instead, but 9 comprises the usual flight formation. Another suggestion would be to form a club immediately and have at least nine builders order together the same type ship to build up a formation for a loan in your city, with a card displaying the names of the nine builders of the ships. It's an opportunity no modelbuilder should pass up if he likes the group idea, for this is something which makes it extremely easy to make really effective aviation displays. Why not start yours right away. See your dealer or send direct for your Kits immediately.

Remember! Dwarf Kits DO NOT CONTAIN LIQUIDS

Ar beled "World's Finest Models"

AERONCA C-3

Easy for beginners. Span 18", length 10¼". Suggested coloring: Red and silver. Kit D-40 ..... **60c**

HOWARD RACER "IKE"

Flies and climbs beautifully. Span 10⅝", length 8⅛". Suggested coloring: white with black details, lettering. Kit D-42 ..... **25c**

A-W QUAD FIGHTER

Very unusual Steady flyer. Now authentic rib spacing. Easy to build. Span 14", length 12¼". Suggested coloring: red, white and blue. Kit D-11 ..... **45c**

MONOCOUPE

Span 16", length 10¼". Suggested coloring: Beautiful cream and orange. This design has won many first prizes for modelbuilders. Kit D-28B **45c**

LINCOLN SPORT

A lightplane sensation. Beginner's model. Span 10", length 8 1/16". Suggested coloring: cream, black trim. Kit D-36 ..... **25c**

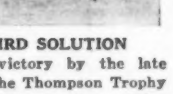
WEDELL-WILLIAMS

This model is a very beautiful and authentic version of the plane Jimmy Wedell himself flew to victory for the 1933 Cup. Capable of excellent speed flights. Suggested coloring: red with black scalloping and bronze motor crankcase, and color separations. Span 13", length 11⅛". Kit D-47 ..... **50c**

Famous '30 LAIRD SOLUTION

It was piloted to victory by the late "Speed" Holman in the Thompson Trophy Classic. Model flies like the Super-Solution—at a fast clip. Suggested coloring: gold wings and tail surfaces, balance black. Span 10⅝", length 9⅛". Order Kit D-46 ..... **50c**

AIR MYSTERY SHIP



Designed. Span 14½", length ", B[illegible] solid appearance. Sug- red, black scallop- Kit D-2D **50c**

tioning his name. However, in ordering direct, be sure that ng and handling charges, except when six or more are ordered, British Isles, add 10% to all regular prices to cover foreign quivalent in foreign stamps acceptable except from Canada, remit 5c, will be mailed to you at once. You will also get a

AND C-D

th Cleveland, Ohio U. S. A.

Airplane Observers Contest

The Winners and Correct Answers—Contest No. 2

IN ORDER to train young men in observing and naming various types of airplanes correctly, the Airplane Observers' Contest was presented to the readers of MODEL AIRPLANE NEWS. The contest has been enormously popular if it is to be judged by the number of entries received and without question many aviation fans now know more about airplanes than they did before they entered the contest. To give correct answers to several of the ships required considerable research, as well as some original thinking regarding sources of information. This was surely beneficial.

Contest No. 2 required that contestants give the names of two of the planes instead of one as in Contest No. 1, and many crashed through with fine entry slips.

At the top of the page the winning entry of Wm. Beck is reproduced. It has been reduced in size, but otherwise it is shown as submitted by him. This entry won because of its accuracy, neatness and simplicity. It was lettered perfectly by hand without any attempt to gain favor by embellishments. All entries were judged on this basis. This contest was not intended to bring out artistic ability but rather accuracy, care and knowledge of aircraft.

The pictures of several of the winners are published here. It is hoped that it will not be the last time they appear in the annals of aviation. A list of the winners and how they placed, follows:

1. William Beck, 162 Salaignac Street, Philadelphia, Penna.
2. William C. Drake, 3 Pine Street, Malden, Mass.

NO.1 EARLY WRIGHT 1913 — NO.4 MARTIN BM-2
NO.2 CURTISS O-40-B — NO.5 WACO WHD
NO.3 BERLINER JOYCE XF3J-1 — NO.6 GRUMMAN SF-1
NAME WILLIAM BECK — ADDRESS 162 SALAIGNAC ST PHILA PA.

A reduced reproduction of William Beck's winning entry. Note the answers to pictures No. 3 and No. 5

1st place winner, William Beck

3. E. McHenry, 663 West 188th St., New York City.
4. Henry Stegman, 131 Nelson Avenue, Jersey City, New Jersey.
5. Stanley Rampey, 480 Convent Avenue, New York City.
6. Walter Jobson, 1870 Haworth Street, Philadelphia, Penna.
7. John E. Steinback, 157 West 74th Street, New York City.
8. Richard Haysen, 4307 Berteau Avenue, Chicago, Illinois.
9. Kenneth W. Hamilton, 5411 Crenshaw Blvd., Los Angeles, Cal.
10. Marie Bergman, 7435 Washington Street, Forest Park, Ill.
11. Orlando Van Rensselaer, 136 South Almont Drive, Los Angeles, Cal.
12. William J. Roehrig. 118 Erie Street, Utica New York.
13. Homer Appleby Jr., Slaughter, La.
14. Richard Thornton, 632 South Lincoln, Aurora, Ill.
15. Howard S. England, 912 Southard Street, Key West, Florida.
16. Gordon S. Williams, 5740-36 Avenue N.E., Seattle, Wash.
17. Edward Sekac, 22-57 43 Street, Long Island City, New York.

Recently the Berliner Joyce Company merged with the North American Aviation Corporation. Several of our readers, bearing this in mind, gave the name of ship No. 3 as North American XF3J-1. This is incorrect, inasmuch as the ship given was designed and constructed by the Berliner Joyce people and is still called the Berliner Joyce XF3J-1. This information comes directly from the office of the North American Aviation Corporation.

The other unknown ship, the Waco WHD, was given by many contestants as WHD-A. As can be seen from the picture, this ship is not armed with a machine gun in the pilot's cockpit; therefore, the designation of "A" is left off.

The problem of placing the names of the planes under the proper picture was not difficult and there were few contestants who were inaccurate in this procedure.

The chief value derived from the contest lay in the knowledge of planes gained. Probably picture No. 1 was the most interesting and served to let some contestants know what pilots used to fly in 1913.

MODEL AIRPLANE NEWS wishes to extend the very best wishes to these young men in their aviation careers.

4th place winner, Henry Stegman

2nd place winner, Wm. C. Drake

6th place winner, Walter Jobson

7th place winner, John E. Steinback

8th place winner, Richard Haysen

12th place winner, William J. Roehig

13th place winner, Homer Appleby Jr.

14th place winner, Richard Thornton

15th place winner, Howard S. England

JUNIOR N.A.A. NEWS

Prepared by National Aeronautic Association, Dupont Circle, Washington, D. C.

1935 National Championship Model Airplane Meet Sets New High Standards at St. Louis, June 27-29.

Many New Champions and New Records Produced After Stiff Competition. Winners Receive Official Washington Reception

THE highest order of competition makes the 1935 National Championship Model Airplane Meet stand out as the most closely contested meet ever held on a national scale. More new records and generally better flight times emphasize the marked improvement that is being constantly made by the builders and flyers of model aircraft.

Careful consideration, real hospitality and thorough preparation with resultant efficiency are the factors contributed by the sponsors and officials which insured the complete success of the meet. A healthy rivalry between contestants completed the setting.

The meet itself was of three days duration but months of preparation had gone into it. The sponsors, Stix, Baer & Fuller Company and the St. Louis Junior N.A.A. Chapter, accepted the sponsorship of the meet last January. With this acceptance began the most painstaking line of planning and preliminary work that a national meet has ever enjoyed. This began when Mr. J. Walter Goldstein of the sponsors' staff made a trip to New York in February to go over the details of the meet with N.A.A. officials, and another trip in March to Washington to complete arrangements.

Indicative of the competition are such flights as thirty-three minutes with outdoor rubber-powered models, more than an hour's duration made by the winning gasoline-powered ship, and twenty-three and a half minutes by the winning indoor rubber-powered model. Such flights would have been considered impossibilities a few years ago.

Carl Goldberg again proved himself the champion of indoor champions with his all-time record flight of twenty-three minutes and twenty-nine seconds. John Stokes came up once more as the National Junior Indoor Champion by winning the Stout Contest and placing second in the Bloomingdale Contest. His winning time in the Stout event was an excellent twenty minutes and fifty-three seconds.

Leo Weiss carried off the Texaco Trophy with a winning gasoline-powered flight of one hour four minutes and twelve seconds. This is only a few seconds less duration than Joe Kovel's world record. Bob Cahill made the best rubber-powered flight of the meet when his model remained in the air for more than thirty-three minutes before passing from the timers' sight. He did this in the tryouts for the Admiral William A. Moffett International Contest. Richard Korda won the Mulvihill Trophy with a single stick tractor model that kept in the air for twenty-four minutes and forty seconds, a new record for that type of model.

Vernon Boehle of Indianapolis proved again that he is a master of outdoor flight by winning the Moffett International Contest finals with a flight time of three minutes one second. Kenneth Ernst, a fellow club member of Boehle, took the Stout Outdoor Trophy with twenty minutes and five seconds. These two performances stamp the Indianapolis boys as the country's best in outdoor competition.

The interior of the Arena during indoor flying

For the second year in succession, Louis Casale found himself at the top of the list in the Exhibition Scale Model Contest for the Model Airplane News Trophy. But this year he had company because Bronik Soroka tied for first place. Five aircraft engineers could not separate the two models and the result showed them tied at 98.7 points each. Observers declared that never before had two such perfect scale models been placed in a national meet.

Torrey Capo won the Bloomingdale Trophy with an indoor cabin fuselage model flight of fifteen minutes thirty-three seconds, a new world record. He also won an airplane trip from St. Louis to Boston, given by American Airlines.

All the winners named above were awarded an official N.A.A. reception in Washington, D.C., July 19-21, which included the White House, the United States Senate, Department of Commerce and other governmental departments. Truly, this was a fitting tribute to the country's model plane champions for 1935.

But all this is only a part of the complete story of the meet. The date set for registration was Thursday, June 27, but contestants began to arrive in St. Louis at least a week earlier. Among the first to put in their appearance were Casale from Syracuse, N.Y.; Dilly from Galt, Ontario; Simmers from New Lenox, Ill.; and DuFlon from Ridgefield, N.J. By Wednesday night at least half of the entrants had arrived in St. Louis, indicating a desirable trend on the part of the contestants to be on hand and ready for the contests.

The Hotel Statler had been designated as headquarters. It is traditional for a Statler Hotel to receive this assignment, New York, Detroit, and St. Louis all having placed their model plane meet headquarters with that fine organization. The hotel had placed a huge room on the third floor at the disposal of the contestants to use as a workshop. This room was the largest ever to be made into a model plane repair shop but it proved to be only just large enough. The gasoline models require more room than their smaller rubber-powered companions. The doors of this room were opened Tuesday night and left open until Sunday night. There were tables galore, plenty of chairs, microfilm tanks and other required equipment for model plane repair work. Day and night could be heard the exhaust of tiny gasoline motors which their owners were tuning up. Sheets of microfilm were always about, hanging up to dry. Balsa chips covered the floor to an unbelievable depth. The hotel management had agreed not to have the room swept out for fear of destroying some delicate model part.

All during Tuesday, Wednesday, and Thursday, there were committee meetings to make certain that all details were whipped into shape. There was a school for the timers, clerks, and other officials. The field staff were under the direction of "Charlie" Mills, St. Louis' go-getter Scout Executive. It was an inspiring sight to see Mr. Mills instructing his aids in their duties and to see the wholehearted enthusiasm that prompted them, to the number of more than

Pittsburgh's contestants. Mrs. Allen in the center

fifty, to devote several days of work in helping put the meet across successfully.

Thursday morning at 8 o'clock, the registration tables were set up in the Statler lobby. The St. Louis Convention and Publicity Bureau took over the job of registration and it would be stating the facts mildly to say that these people knew their business. The 1935 registration was the essence of smoothness. It is reported that this group have registered nearly four thousand conventions in St. Louis in the last several years. Mr. Charles Hatfield, head of this bureau, may well be proud of his work. By midnight Thursday the registration was complete and tabulations gave the total as 305 contestants, a high total indeed.

Meanwhile the contestants were busily engaged in setting up their models, practicing in the Arena, trying out their gasoline models at the airport, sight-seeing, and renewing old acquaintances or forming new ones. The sponsors had provided an array of entertainment—ball games in the afternoons, movies at night, inspection of the Lindbergh memorial collection of trophies, medals, and souvenirs. Many of the registrants took a trip on the Mississippi River on board one of the show boats.

Arrangements had been made for the Weather Bureau at the airport to phone into headquarters the weather predictions for Friday. It was good news, when 6 o'clock came, to hear that the weather would be perfect. And that is just about what St. Louis handed to the model flyers all day Friday and Saturday. It would be impossible to turn in such records as were made unless the weather had been nearly perfect.

Bright and early Friday morning everybody went out to Lambert Field, the St. Louis municipal airport. Many rode in busses provided by the sponsors under the direction of Sam Greenland. These busses were something to write home about. Large double deckers, each capable of carrying sixty passengers in comfort. The last bus left the hotel at 8:45. Also, a number of contestants rode out in their own cars.

Upon arrival at the field, it was immediately evident that there had been no letdown in the high order of preparation. Twenty group tables had been set up. There were four weighing stations, headquarters tent, first-aid ambulance, public address system, ice water provision, and the inevitable soda water stands. There were also cars for pursuing models, one car for each pair of timers. There were over fifty officials and a huge airport across which to fly the models. The whole setting was under the capable supervision of Mr. C. E. Carmichael, Contest Director, his assistant, "Bob" Sommers, and the conscientious, hard-working, "Charlie" Mills who was Field Judge. The Lambert St. Louis Airport Association had made complete arrangements for the use of the field which was under the supervision of the airport management and a staff of naval officers headed by Lt. John W. Geppert. The regular transport flying schedule was carried out all day without very serious inconvenience to any model or contestant.

The smooth voice of Announcer Silverson, one of the KMOX staff, brought many an announcement to the attention of the crowd and contestants. His invaluable services helped to keep the meet running without confusion. He warned of the arrival or impending take-offs of the large transports, announced new records and outstanding flights, helped lost souls to find themselves, and restored found property to its owners. After eight hours of constant announcing, his voice was still as smooth as when he started.

Frank Tlush's high dihedral gas model

The first indication that it would be a banner day was the announcement about 11 o'clock that Frieda Bonat's model had passed out of sight of the airport after seven minutes and was still going strong, high up. From then on it was one record after another that was being broken. Much interest centered around Frieda Bonat as she was one of three girls who were competing. The others were Mary Roll, last year repeater, and Mrs. R. K. Allen. It is good to see an increase in the number of feminine contestants and a real turnout of girl flyers is expected next year.

Lunch was served at noon by the sponsors to all contestants and officials. This did not stop the flying at all and many a flier and timer were seen in action with sandwiches between their teeth. It simply meant that there was one more thing that needed doing, and everybody did it. Splendid box lunches that had been put up fresh that morning constituted the refreshments.

There was a slight breeze all day from the south or southeast. Many cumulus clouds floated over the airport affording the much-desired thermal currents that carry models out of sight. Several models were carried out beyond the Missouri River. A few fell into it. The sun was out clear all day, but the heat was not oppressive. Better conditions are seldom found.

No special runways had to be provided as the airport's smooth runways were made to order. There was an abundance of space in which to launch models by hand or R.O.G. The gasoline models were segregated at a point about a quarter mile away from the rubber-powered groups. These were carefully policed by uniformed officers and the usual crowding was eliminated. The rubber-powered contestants were not endangered by the heavier gas models at any time.

The Moffett trials were conducted up to 2 o'clock and the finals were run off from three to six. The competition for places on the American team was especially strong. Fourteen Americans did over three minutes in their trial flights. The finals were conducted so late in the day that the thermal currents had disappeared and the times made in the finals represent pure powered flight. This year's Moffett was unusually international in flavor with six models from Great Britain, five from Canada, one from New Zealand, one from Scotland, and six from the United States. One Canadian model cracked up so that only four finished. John Dilly was on the Canadian team but his was the model that crashed.

When 6 o'clock arrived and the outdoor events were terminated, it was found that many new records had been made and several new champions had been found. Bassett was unfortunate in having his gas model dive into the Missouri River, miles away from Lambert Field, after a flight of nearly thirty-seven minutes. After that mishap, his engine was balky and he was

Bert Pond and Kenworthy's entry from Great Britain

not able to get another flight of more than a few minutes' duration. Tlush had been unlucky in having a shift of wind while his gas model was in flight and it got away from the timers after remaining in sight eighteen minutes. Joe Kovel, national record-holder, made a fine flight of over thirty-one minutes. The winner, Leo Weiss, whose model was the fastest one on the field, used double fins and rudders. His ship gained altitude quickly and stayed in sight for more than an hour, finally lost itself high in the air. It was recovered on a farm more than twenty miles away a few days after the meet. In all, twenty-four contestants succeeded in getting their gasoline powered models into the air for official flights. Many unofficial flights terminated in crashes Some models simply would not perform or the motors would refuse.

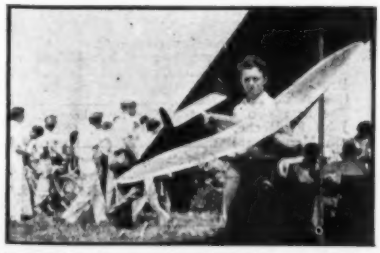
In the rubber-powered contests, conventional designs proved to be the best flyers. Their builders had solved the relationship between power, wing loading, angle of incidence, and other important factors. It is noted that the best outdoor flights were registered by middle western builders, only a few easterners getting at all near the top of the lists.

There had been so many outdoor flights that it was not until 1 o'clock the next morning that officials were able to declare the final standing. Those officials who labor far into the night are seldom seen at their work but, nevertheless, they are a part of the machinery necessary to a meet.

An interesting side light on the meet this year is the age spread. The youngest contestant was twelve; the oldest forty-three. One case of father and son was noted. William Pascoe, Sr., was competing with William Pascoe, Jr. This is a healthy condition and one that the N.A.A. hopes will continue.

A few years ago there was an American League ball player who led the league in batting averages. He is Harry Heilman and he used to play with Detroit. This year his son, Harry, Jr., was a contestant at the meet and did very well. It is reported that his father can throw a glider to unbelievable heights. It will be worth watching to see if Harry, Jr., doesn't develop the same ability.

Friday morning saw all the contestants and officials transfer their activities to the St. Louis Arena for the indoor flying.



Leo Weiss, Texaco Trophy winner, with his winning ship

This great structure is one of the best buildings in the country for that purpose. It has a ceiling of one hundred thirty-five feet and the roof is made of mortised rafters that prevent a model being held as usually happens with steel girder construction. The floor area is so large that there is room for many contestants to operate at one time. The building can seat 25,000, which fact indicates its size.

The weather conditions outdoors were similar to those of the day before. If anything, the wind velocity was a little less. The sun warmed the roof and gave indoor conditions that are essential to record flights. There was not much draft inside at any height above the floor.

Indoor flying got under way about 10 o'clock in the morning with the groups of contestants and officials arranged around the Arena floor at the edge. This left the main portion of the floor clear for launching models. The Arena was under police supervision all day and only authorized persons were permitted on the floor. All others were allowed to find seats in the balcony from which a good view was afforded. Many thousands of visitors came and went during the day, all expressing their amazement at anything so fine as indoor flying models of microfilm construction.

As usual the first hour or so was taken

R. K. Allen with Rushbrooke's "Mayfly." One of the British entries

up with preliminary test flying. Most of the contestants reported that they had to use a little more power than is usually required. But after the correct power ratio had been determined, ceiling-high flights were made regularly. A few collisions occurred but seldom did any real damage to either of the colliding models.

The first announcement of importance was made about 11 o'clock when it was reported that John Stokes was once more busily engaged in setting new records. John is only fourteen but handles himself and his models with all the assurance of a seasoned veteran. The end of the day found the Stout Contest had been won by Stokes with a flight of twenty minutes fifty-three seconds. Six contestants had surpassed last year's Stout mark.

The outstanding indoor flight was made by Carl Goldberg who is over twenty-one and therefore in the Open Age Class.

Sumits' 12-minute cabin fuselage model. Note the trim lines

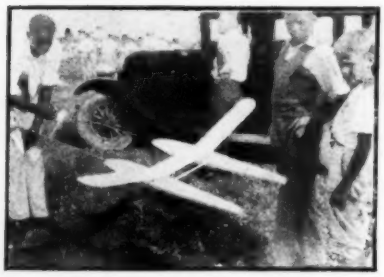
Carl made twenty-three minutes twenty-nine seconds for a new all-time indoor record. He won the Springfield Trophy for the second time in succession by this flight. The trophy's donor, Ernest Walen, was not able to be present to see the winning flight. In fact, had he been present, he would have been competing for it himself.

The Bloomingdale Contest was won by Torrey Capo when his indoor cabin fuselage model flew to the new record of fifteen minutes thirty-three seconds. Stokes was a close second with a few seconds less. There were ten contestants in this event who surpassed ten minutes. These indoor cabin models are very graceful and stable in flight. Their landing gear is all but invisible when they are at the top of their flights, yet the models are required under the rules to take off on real landing gear under the model's own power.

No radical designs were noted among the successful indoor models. The tendency appears to be toward lighter weight, longer propellers, more attention to wing shape and air foil. The customary high wing with a few builders using filament or thread bracing was the most frequently observed. After the official flights, a number of contestants attempted record flights. Herbert Greenberg succeeded in making a new record for a senior contestant in one of these efforts when he made twenty-two minutes eleven seconds. This did not cut any figure in the official contest results, the flight having been made outside the regular official flights. Greenberg used a microfilm-covered propeller.

During the meet, a most interested observer was "Bill" Enyart, N.A.A. Contest Board Secretary. He was on his way to the Tulsa Air Races and was able to drop off in St. Louis for three days and witness the model plane meet. It is seldom that a Washington official is able to attend the model plane meets and Bill feels that his time was very well spent.

Indoor flying was terminated promptly at 6 o'clock and the officials went through the records to determine the order of finish. While this was gong on, all the contestants were preparing themselves for the big banquet that had been arranged for them by the sponsors in the large Moderne Restaurant in Stix, Baer & Fuller's store. The ban-



An interesting double fuselage model that did not win

quet was opened at 8:30 and about five hundred were seated.

At the speakers' table were so many celebrities that it is impossible to name them all. One of the best known was Major "Jimmy" Doolittle, who was also one of the speakers. As is his custom, he spoke briefly and to the point. Mr. Aaron Fuller spoke on behalf of the sponsors. Mr. J. Walter Goldstein, who had done so much preliminary work for the meet and who headed up all the committees, told of his experiences in connection with his preparations. Lawrence Shaw, of Junior Birdmen, told of his pleasure at being present and expressed wonder at where all the trophies came from. Several telegrams were read, among them being one from Senator McAdoo, N.A.A. President and another from Charles H. Grant, Editor of MODEL AIRPLANE NEWS. Both of these gentlemen expressed regret at being unable to attend and congratulated the sponsors and contestants.

The banquet was an ample provision against the ravages of hunger due to two days of constant model plane flying and chasing. Neat souvenir menus were distributed. These were in the form of orders from General Headquarters, specifically from Commander in "Chef." Not only the form and style but also the contents appealed to all. The large dining hall was decorated with countless souvenir pennants, posters, and placards. These were all appropriated by enthusiastic contestants and today many clubrooms and workshops of model plane builders are decorated with reminders of the fine time that was had at St. Louis.

The big final event on the banquet program was the awarding of the trophies and medals. This was done by H. W. Alden of the N.A.A. and was accomplished in as short a time as possible considering the large number of awards. Whenever practicable, the 1934 holder of a large annual N.A.A. trophy was called upon to present it to the 1935 winner.

As a surprise announcement, no prior mention having been made of it, the winners were told that they had been awarded a trip by plane to an official N.A.A. reception in Washington during the week end of July 19-21. This was made possible by the cooperation of the home-town sponsors of the winners, the Parks Air College, and the American Airlines. Mr. Oliver L. Parks, president of the college, agreed to have his Chief Pilot, George J. Gruen, fly four winners to Washington and return in the school's Lockheed Vega. This ship was formerly Amelia Earhart's and the one in which she won the Women's Transcontinental Air Derby. The four to make the trip in this plane are Goldberg, Korda, Ernst, and Boehle. American Airlines assisted in transportation for the other six —Capo, Weiss, Soroka, Stokes, Marchi, and Casale. The Syracuse, N.Y., Exchange Club and Syracuse Model Airplane Club helped in making it possible for Casale to make the trip. The Bamberger Aero Club, Newark, N.J., proved helpful in seeing that Weiss made the trip.

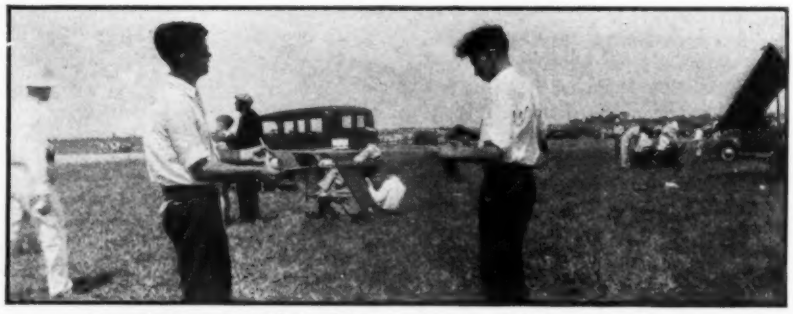
John Stokes, National junior indoor champion

The generally expressed sentiment of those who attended was that the 1935 meet was the best in their experience and that it would take a major calamity to keep them from attending the 1936 meet, wherever it might be held. There was evident at all times a feeling of complete satisfaction. The sponsors had provided a wonderful setting for the meet, plenty of enthusiastic help, good entertainment, and perfect St. Louis hospitality. Everybody realized that they had attended a well-planned and well-executed national meet that had no weaknesses.

The major brunt of the whole affair came on two gentlemen who gave unsparingly of their time for months in advance. These are Mr. J. Walter Goldstein and Mr. C. E. Carmichael of the sponsor's staff. Mr. C. C. Barnett did a mighty big job in assembling and preparing the trophies and medals. Just as an indication of the magnitude of this task, the number of letters of engraving on the cups and trophies came to more than 4500. Others have already been mentioned. Many who took important parts in the meet are not mentioned due to shortage of space.

Among the N.A.A. Contest Directors and Club Directors who were present, are E. L. Hughes, Capt. Willis C. Brown, Victor Fritz, H. M. Jellison, Bertram P. Pond, Arthur Boehle, David W. Wehman, Robert K. Allen, Donald F. Sump, Edward Clarke of *Junior Aviator*, Charles Tlush, Nathan Polk, Frank Zaic, "Bob" Sommers, Jesse Bieberman, and others, making up an impressive group of model aviation enthusiasts.

The St. Louis organizations that assisted so ably in making the meet such an eventful success, are: St. Louis Chamber of Commerce Air Board, Lambert St. Louis Airport Association, St. Louis Convention and Publicity Bureau, St. Louis Advertising Club, St. Louis Junior N.A.A. Chapter, and Stix, Baer & Fuller Company.



General view of the flying field. Contestants winding rubber motors

Special thanks are also due Major "Jimmie" Doolittle, Shell Petroleum Corporation, Loew's State Theater, Fox Theater, the St. Louis Browns, Forest Park Highlands, Jefferson Memorial, Mr. Oliver L. Parks, "Charlie" Mills, American Airlines, Comet Model Airplane Supply Co., Whitfield Paper Works, and *Scientific American*.

The official results of the 1935 National Championship Meet are listed in tabular form.

Exhibition Scale Model Contest for Model Airplane News Trophy

No age limit for contestants

1. Louis Casale, Syracuse, N.Y. (Waco Taperwing) 98.7
   Bronik Soroka, Cleveland, Ohio (Curtiss Goshawk F11 C-2) 98.7
   The first two were tied for first honors.
2. John F. Roche, Kansas City, Mo. (Stinson Monoplane) 97.4
3. Harry Walker, Cleveland, Ohio (U.S. Navy 4-1) 96.9
4. Fred Mayfield, Akron, Ohio (F-4B4) 95.7
5. Robert Willoughby, Kansas City (Boeing 247) 93.0
6. Michael Holly, Chicago, Ill. (Boeing P 12 B) 91.0
7. Max Sokol, Hamtramck, Mich. (Waco V1C) 90.2

8. Carroll Krupp, Akron, Ohio (Curtiss Hawk P6E) 90.1
9. Clarence Ferguson, St. Louis (Stinson Detroiter) 90.0
(Bristol Fighter) 90.0
10. Robert Shea, Brighton, Mass. (Vought Corsair) 90.0
11. Donald Dodd, St. Louis (Sikorsky S-42) 89.0
12. Kenneth Bonesteel, Cuyahoga Falls, Ohio (Martin Bomber) 88.9
13. Stanley Stanick, Salamanca, N.Y. (Bellanca Aircruiser) 87.2
14. Willis Potthoff, Brentwood, Mo. (DO-X) 86.0
15. Richard Wenner, Allentown, Pa. (Boeing P26A) 84.0
16. Tirey Vickers, St. Louis (Lockheed Sirius) 83.2
17. George B. Rak, Vandergrift, Pa. (Boeing P12B) 80.0
18. James McCarty, Akron, Ohio (Curtiss Hawk P6E) 79.6
19. Christy Magrath, St. Louis (Curtiss Racer) 78.7
20. Robert Barrows, Kalamazoo, Mich. (Curtiss Hawk P6E) 77.3
21. A. W. Courtial, Jr., St. Louis (Stinson Reliant) 76.0
22. Harold V. Coons, Macedonia, Ia. (Stinson Reliant) 69.0
23. Philip Zecchitella, Newark, N.J. (Stinson Junior) 68.0
24. Hewitt Phillips, Belmont, Mass. (Pitcairn Autogiro) 67.0
25. William Griswold, Chicago, Ill. (Boeing P12B) 64.0

The two winners were invited to the N.A.A. reception in Washington, D.C.

Mulvihill Contest for Outdoor Stick Models, Hand-Launched

Age limit—under 21 years

		Min.	Sec.
1.	Richard Korda, 20, Cleveland, Ohio Winner receives custody of N.A.A. MULVIHILL TROPHY for one year and miniature trophy for permanent possession, year's subscription to *Scientific American*, and trip to N.A.A. Washington reception.	24	40.8
2.	Wallace Simmers, 16, New Lenox, Ill.	21	10
3.	William Pascoe, Jr., 18, St. Louis, Mo.	10	34.5
4.	Joseph Kovel, 20, Brooklyn, N.Y.	9	36.4
5.	Alvie Dague, 15, Tulsa, Okla.	8	42.7
6.	Frieda Donat, 20, Detroit, Mich.	8	26
7.	Donald Kraus, 16, Erie, Pa.	6	20
8.	Walter Dickinson, 16, Newark, N.J.	6	14.1
9.	David Seltzer, 19, St. Louis, Mo.	5	52.6
10.	Harold Foerster, 15, St. Louis, Mo. ..	4	33
11.	David B. Hecht, 19, New York, N.Y.	4	24
12.	Alfred Heim, 16, Beloit, Wis.	4	21
13.	Donald Dodd, 15, St. Louis, Mo.	4	09.9
14.	Bob Shackleford, 20, St. Louis, Mo...	3	54
15.	Albert Mikalson, 20, Billings, Mont.	3	23.9
16.	Hewitt Phillips, 17, Belmont, Mass. ..	3	21
17.	Gerald Ritzenthaler, 19, Prairie View, Ill.	3	18
18.	Ira Fralick, 20, Syracuse, N.Y.	3	16.5
19.	Lawrence Harlow, 14, Indianapolis, Ind.	3	16
20.	Michael Roll, 20, Dearborn, Mich.	3	13
21.	George Banko, 17, Cleveland, Ohio ..	3	04
22.	Gordon S. Light, 19, Lebanon, Pa.	3	03
23.	Earl Farber, 16, St. Louis, Mo.	2	56.5
24.	Harry Heilman, 13, Detroit, Mich.	2	54
25.	Edward Levy, 17, St. Louis, Mo.	2	53
26.	Louis Sutter, 16, St. Louis, Mo. (2 36)	2	49
27.	C. W. Fries, 20, St. Louis, Mo. (1 23)	2	49
28.	Stanley Patrick, 19, Wyandotte, Mich. (1 15)	2	49
29.	Mary Roll, 19, Dearborn, Mich.	2	47
30.	Joseph Conradi, 15, St. Louis, Mo. ..	2	45.7
31.	James Michael, 18, Crawfordsville, Ind.	2	45
32.	Frank Kiewicz, 18, Detroit, Mich.	2	35
33.	John Freeman, 17, Indianapolis, Ind.	2	34.4
34.	Harry Dolfi, 16, Chicago, Ill.	2	31
35.	Jim Cahill, 17, Indianapolis, Ind.	2	30
36.	Alex Nekinken, 13, Chicago, Ill.	2	27.8
37.	Ralph Harlow, 17, Indianapolis, Ind.	2	27
38.	Garland Eickmeyer, 18, Fort Wayne, Ind.	2	26.5
39.	Ray Podolsky, 20, St. Louis, Mo.	2	23.4
40.	Marvin Setzke, 18, Chicago, Ill.	2	20
41.	Robert Shea, 18, Brighton, Mass.	2	18
42.	Harold Lamont, 19, St. Louis, Mo. (1 56)	2	15
43.	Charles Stewart, 18, Tulsa, Okla. (1 06)	2	15
44.	Bruno Marchi, 19, Medford, Mass. ..	2	14
45.	Hugh Schneidewind, 13, St. Louis, Mo.	2	07.7
46.	Vernon Hanson, 20, Minneapolis, Minn.	2	07.5
47.	Hubert Wise, 17, Akron, Ohio	2	07
48.	Howard Trampenau, 19, Erie, Pa.	2	05
49.	Don Lueke, 17, St. Louis, Mo.	2	03.5
50.	Russell Yungbluth, 18, St. Louis, Mo.	2	02

Carl Goldberg, indoor champion, helps wind a British entrant's rubber motor.

Outdoor Stick Model Contest for Balfour Trophy, Open-Age Class

Age limit—over 21

1.	B. F. Kiewicz, Detroit, Mich.	8	00
2.	Robert Willoughby, Kansas City, Mo.	5	58
3.	Jacob Friedman, St. Louis, Mo.	3	02.5
4.	Christy Magrath, St. Louis, Mo.	2	50
5.	John Banko, Cleveland, Ohio	2	49
6.	Owen Rothrock, Detroit, Mich.	2	45
7.	Edward Guth, Syracuse, N.Y. (2 00)	2	14
8.	Harry Walker, Cleveland, Ohio (1 49)	2	14
9.	William Pascoe, Sr., St. Louis, Mo. (1 21)	2	14
10.	Chester Lanzo, Cleveland, Ohio	2	04
11.	Frank Zaic, New York, N.Y. (1 37)	2	00
12.	John P. Banko, Cleveland, Ohio (1 24)	2	00
13.	Carl Goldberg, Chicago, Ill.	1	47.5
14.	Capt. Willis C. Brown, Arlington, Mass.	1	31
15.	W. L. Myers, Memphis, Tenn.	1	10.5
16.	Roy Wriston, Tulsa, Okla.	1	10.1
17.	Bob File, Columbus, Ohio	1	10
18.	Hubert Owens, Memphis, Tenn.		35.2
19.	Frances L. Allen, Pittsburgh, Pa.		34.5

Stout Outdoor Contest for Cabin Fuselage Models, R.O.G.

Age limit—under 21

1.	Kenneth Ernst, 19, Indianapolis, Ind. ..... 20 Winner holds Stout Outdoor Trophy for one year, miniature trophy for permanent possession, and trip to N. A.A. Washington reception.		05
2.	Russell Yungbluth, 18, St. Louis, Mo.	12	40
3.	Carroll Krupp, 17, Akron, Ohio	12	12.8
4.	Joseph Kovel, 20, Brooklyn, N.Y.	9	13.9
5.	Vernon Boehle, 20, Indianapolis, Ind.	6	35
6.	Frank Kiewicz, 18, Detroit, Mich.	3	56
7.	Fred Mayfield, Jr., 17, Akron, Ohio	3	55.2
8.	Charles Stewart, 18, Tulsa, Okla.	3	34.8
9.	Lawrence Smithline, 18, New York, N.Y.	3	20
10.	James Cahill, 17, Indianapolis, Ind.	3	12.2
11.	Edmund Swort, 15, Chicago, Ill.	3	05
12.	Anthony Boehle, 16, Indianapolis, Ind.	2	50
13.	James Neff, 19, Dayton, Ohio	2	35
14.	William Ying, 16, Rosebank, Staten Island, N.Y.	2	30.3
15.	Lawrence Harlow, 14, Indianapolis, Ind. (1 39)	2	27
16.	Harold Foerster, 15, St. Louis, Mo. (0 37)	2	27
17.	Hewitt Phillips, 17, Belmont, Mass.	2	26.6
18.	Gordon Light, 19, Lebanon, Pa.	2	23
19.	Marvin Setzke, 18, Chicago, Ill.	2	21.3
20.	Garland Eickmeyer, 18, Fort Wayne, Ind.	2	16.5
21.	Lawrence Phillips, 19, Tulsa, Okla.	2	01.1
22.	Harry Dolfi, 16, Chicago, Ill.	2	01
23.	Roy Marquardt, 17, Burlington, Iowa	1	59.9
24.	Vernon Hanson, 20, Minneapolis, Minn.	1	58.6
25.	Janvier O'Hara, 18, Kansas City, Mo.	1	57

Vernon Boehle, (right) outdoor winner, working on his indoor model

26.	Gerald Ritzenthaler, 19, Prairie View, Ill.	1	56
27.	Bronik Soroka, 19, Cleveland, Ohio	1	50
28.	Richard Korda, 20, Cleveland, Ohio	1	42
29.	Charles Bieke, 19, St. Louis, Mo.	1	41.6
30.	Louis Sutter, 16, St. Louis, Mo.	1	42
31.	Donald Lueke, 17, St. Louis, Mo.	1	40
32.	William Bozeman, 18, Kansas City, Mo. (1 32)	1	35
33.	Ira Fralick, 20, Syracuse, N.Y. (1 24)	1	35
34.	Albert W. Courtial, Jr., 18, St. Louis, Mo.	1	33
35.	Bruno Marchi, 19, Medford, Mass.	1	31.4
36.	Joseph Matulis, Jr., 20, Dvorak Park, Ill.	1	28.2
37.	Clement Turansky, 17, Pittsburgh, Pa.	1	28
38.	Jack King Estes, 20, Camdentown, Mo.	1	27.2
39.	John Freeman, 17, Indianapolis, Ind. (1 26)	1	27
40.	Julius Takacs, 20, Cleveland, Ohio ( )	1	27
41.	Marvin Schmidt, 19, St. Louis, Mo.	1	26.2
42.	Ray Podolsky, 20, St. Louis, Mo.	1	25.5
43.	William Bates, 16, Beloit, Wis.	1	25.4
44.	Joseph Conradi, 15, St. Louis, Mo. ..	1	24.5
45.	Alvie Dague, 15, Tulsa, Okla.	1	23.2
46.	Earl Farber, 16, St. Louis, Mo.	1	23
47.	Bob Shackleford, 20, St. Louis, Mo. (1 18)	1	22
48.	Vic Cunnyngham, 17, St. Louis, Mo. (0 51)	1	22
49.	Robert Toft, 15, Minneapolis, Minn.	1	21
50.	Albert Mikalson, 20, Billings, Mont.	1	19.5

Outdoor Contest for Cabin Fuselage Model R.O.G. Open-Age Class for N.A.A. Trophy

Age limit—over 21

1.	William Sumits, Kansas City, Mo. ..	12	00
2.	Walter Getsla, Chicago, Ill.	3	00
3.	B. F. Kiewicz, Detroit, Mich.	2	35
4.	Harold Coovert, Dayton, Ohio	1	59.8
5	Richard Rioux, Chicago, Ill.	1	51
6.	Robert Lisiecki, Cleveland, Ohio	1	41
7.	Edward Guth, Syracuse, N.Y.	1	36
8.	Bob Willoughby, Kansas City, Mo. ..	1	32
9.	Chester Lanzo, Cleveland, Ohio	1	30
10.	William Pascoe, Sr., St. Louis, Mo.	1	20.2
11.	John P. Banko, Cleveland, Ohio	1	14
12.	Theodore Skingel, Cleveland, Ohio ..	1	12
13.	Harry Walker, Cleveland, Ohio	1	11.5
14.	John Banco, Cleveland, Ohio	1	06
15.	Frank Zaic, New York, N.Y.	1	05

Texaco Contest for Gasoline-Powered Models, R.O.G.

Age limit—over 15 and under 21

1.	Leo Weiss, 16, New York, N.Y. .... Winner holds Texaco Trophy for one year, miniature trophy permanently, receives one year's subscription to	64	12

Mary Roll and Frieda Bonat (left). On the right, "Bill" Enyart examines Zaic's model

Scientific American, and trip to N. A.A. reception in Washington.

2.	Bruno Marchi, 19, Medford, Mass.	41	55
3.	Maxwell Bassett, 20, Philadelphia, Pa.	36	49
4.	Joseph Kovel, 20, Brooklyn, N.Y.	31	05
5.	Francis Tlush, 18, Lyndhurst, N.J.	17	56
6.	Franklin Dewey, 17, Grosse Point, Mich.	9	17.6
7.	Emanuel Radoff, 20, Newark, N.J.	6	09
8.	Vernon Boehle, 20, Indianapolis, Ind.	3	35
9.	Herbert Greenberg, 19, Newark, N.J.	2	04.7
10.	Raymond Podolsky, 20, St. Louis, Mo.	1	55.5
11.	Joseph Neigel, 17, Fairlawn, N.J.	1	04
12.	Bernarr Anderson, 18, Akron, Ohio		24.6
13.	Frank Ehling, 18, Jersey City, N.J.		22.6
14.	Samuel Capen, Jr., 20, St. Louis, Mo.		20.5
15.	Alton DuFlon, Jr., 18, Ridgefield, N.J.		17.3
16.	George Rakous, 18, Berwyn, Ill.		15.5
17.	Robert Miller, 16, St. Louis, Mo.		11.6

Contest for Gasoline-Powered Models, R.O.G. For Comet Trophy Open-Age Class

Age limit—over 21

1.	Hubert Lacey, St. Louis, Mo.	17	58
2.	F. J. Dallaire, Detroit, Mich.	15	30
3.	J. D. Raymond, Jackson, Mich.	6	55.2
4.	Ludwig Bielko, Newark, N.J.	4	25
5.	Jesse Bieberman, Philadelphia, Pa.	3	41
6.	Winford Davis, Kansas City, Mo.	1	24
7.	Benj. Shereshaw, Newark, N.J.		36

International Moffett Contest for Cabin Fuselage Models, R.O.G.

No age limit

Tryouts for Selection of Six Members of the United States Team

1.	Robert Cahill, Indianapolis, Ind.	33	00
2.	Vernon Boehle, Indianapolis, Ind.	28	30
3.	Ralph Kummer, St. Louis, Mo.	11	08.5
4.	Fred Mayfield, Jr., Akron, Ohio	11	05.2
5.	Carroll Krupp, Akron, Ohio	9	02.2
6.	Henry Thomas, Akron, Ohio	4	56
7.	Frank Kiewicz, Detroit, Mich.	4	34
8.	Hewitt Phillips, Belmont, Mass.	4	00
9.	Bruno Marchi, Medford, Mass.	3	59.2
10.	Russell Yungbluth, St. Louis, Mo.	3	53
11.	Kenneth Ernst, Indianapolis, Ind.	3	33.7
12.	Howard Trampenau, Erie, Pa.	3	15
13.	Edward Guth, Syracuse, N.Y.	3	08
14.	Jim Cahill, Indianapolis, Ind.	3	04
15.	Edmund Swort, Chicago, Ill.	2	58.8
16.	Hubert Wise, Akron, Ohio	2	44.1
17.	Lawrence Harlow, Indianapolis, Ind.	2	28
18.	Albert Mikalson, Billings, Mont.	2	26.2
19.	Bernarr Anderson, Akron, Ohio	2	19
20.	Dale Koozer, Mansfield, Ohio	2	02.1

Moffett Contest Finals for Rear Admiral William A. Moffett Memorial Trophy

1.	Vernon Boehle (USA) Winner holds Moffett Trophy for one year, miniature trophy permanently, and wins trip to N.A.A. Washington reception.	3	01.4
2.	Carroll Krupp (USA)	2	51.2
3.	Henry Thomas (USA)	2	15
4.	P. L. Wilson (Great Britain)	1	59.2
5.	John Young (Scotland)	1	42.6
6.	Robert Cahill (USA)	1	37.6
7.	Vernon Gray (New Zealand)	1	18
8.	C. S. Rushbrooke (Great Britain) (1 13)	1	17
9.	Ralph Kummer (USA) (1 09)	1	17
10.	J. W. Kenworthy (Great Britain)	1	12.2
11.	C. T. Buffery (Great Britain)	1	05.8
12.	L. Rushbrooke (Great Britain)	1	04.5
13.	D. E. Bianchi (Great Britain)		58
14.	Jack Chapman (Canada)		47.5
15.	Harry Burrows (Canada)		40.2
16.	Albert Pow (Canada)		36.4
17.	James Haffey (Canada)		35.4
18.	Fred Mayfield (USA)		15.5
19.	John Dilly (Canada) model crashed		

Stout Indoor Contest for Stick Models, Hand-Launched

Age limit—under 21

1.	John S. Stokes, Jr., 14, Huntingdon Valley, Pa. Winner holds Stout Indoor Trophy for one year, miniature trophy permanently, and wins trip to N.A.A., Washington reception.	20	53
2.	Donald Godfrey, 16, Detroit, Mich.	20	22.5
3.	Joseph Conradi, 15, St. Louis, Mo.	19	57.2

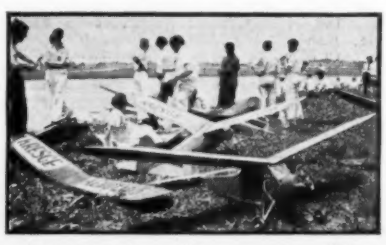
Wallace Simmers, left, and his mechanic. An unusually good team

4.	Lawrence Smithline, 18, New York, N.Y.	19	51
5.	Jim Cahill, 17, Indianapolis, Ind.	19	38
6.	Bruno Marchi, 19, Medford, Mass.	19	18
7.	Robert Cahill, 20, Indianapolis, Ind.	18	43.5
8.	Ralph Kummer, 19, St. Louis, Mo.	18	25
9.	Frank Kiewicz, 18, Detroit, Mich.	18	15.5
10.	Joseph Matulis, Jr., 20, Dvorak Park, Ill.	17	51
11.	Joseph Kovel, 20, Brooklyn, N.Y.	16	58.4
12.	Michael Roll, 20, Dearborn, Mich.	16	50
13.	Vernon Boehle, 20, Indianapolis, Ind.	16	36
14.	Herbert Greenberg, 19, Newark, N.J.	16	34.8
15.	Gifford Hefley, 19, Norman, Okla.	16	03.2
16.	Jack Jenkins, 17, Chicago, Ill.	15	49.5
17.	Alvie Dague, Jr., 15, Tulsa, Okla.	15	48.2
18.	Harry Dolfi, 16, Chicago, Ill.	15	42
19.	Hewitt Phillips, 17, Belmont, Mass.	15	31
20.	Thomas Fleming, 20, Beachmont, Mass.	15	24
21.	William Sherwood, 17, Orange, N.J.	14	49
22.	Walter Schmidt, 17, Syracuse, N.Y.	14	33
23.	Edward Levy, 17, St. Louis, Mo. (11 13)	14	32
24.	Torrey Capo, 18, Quincy, Mass. (10 49)	14	32
25.	Albert Courtial, Jr., 18, St. Louis, Mo.	14	28
26.	Roy Marquardt, 17, Burlington, Iowa	13	34.5
27.	Walter Good, 19, Kalamazoo, Mich.	12	59.8
28.	Paul Strategier, 18, Norman, Okla.	12	51.2
29.	James Haffey, 18, Toronto, Canada (12 05)	12	33
30.	Russell Yungbluth, 18, St. Louis, Mo. (8 50)	12	33
31.	John Wallace, Toronto, Canada	11	59.8
32.	Harry Burrows, Toronto, Canada	11	45
33.	Ira Fralick, 20, Syracuse, N.Y.	11	16
34.	Theo. Nelson, 15, Topeka, Kans.	11	06.9
35.	Edgar Fulmer, 19, McKees Rocks, Pa.	9	15

Indoor Stick Model Contest, Hand-Launched, for Springfield Trophy Open-Age Class

Age limit—over 21

1.	Carl Goldberg, Chicago, Ill. Winner receives Springfield Trophy to hold for one year, miniature trophy to keep permanently, one year's subscription to *Scientific American*, and trip to N.A.A. Washington reception.	23	29.3
2.	Roy Wriston, Tulsa, Okla.	15	44.4
3.	Walter Getsla, Chicago, Ill.	15	34.5
4.	Owen Rothrock, Detroit, Mich.	14	21.4
5.	B. F. Kiewicz, Detroit, Mich.	14	14.2
6.	Capt. Willis Brown, Arlington, Mass.	14	13
7.	John Dilly, Galt, Ontario	13	56.2
8.	Jesse Bieberman, Philadelphia, Pa.	13	46.7
9.	Jacob Friedman, St. Louis, Mo.	12	40
10.	Chester Lanzo, Cleveland, Ohio	7	57
11.	Bob File, Columbus, Ohio	5	47.5



A cluster of gasoline-powered models

Bloomingdale Contest for Indoor Cabin Fuselage Models, R.O.G.

Age limit—under 21

1.	Torrey L. Capo, 18, Quincy, Mass. Winner receives Bloomingdale Trophy to hold for one year, miniature trophy to keep permanently, American Airlines trip from St. Louis to Boston, and trip to N.A.A. Washington reception.	15	33
2.	John S. Stokes, Jr., 14, Huntingdon Valley, Pa.	15	05.6
3.	Robert Cahill, 20, Indianapolis, Ind.	13	15.8
4.	Thomas Fleming, 20, Beachmont, Mass.	12	37
5.	James Cahill, 17, Indianapolis, Ind.	12	33
6.	Hewitt Phillips, 17, Belmont, Mass.	11	57
7.	Walter Good, 19, Kalamazoo, Mich. (9 49)	11	05
8.	Walter Schmidt, 17, Syracuse, N.Y. (9 03)	11	05
9.	Wilbur Tyler, 18, Everett, Mass.	11	01
10.	Herbert Greenberg, 19, Newark, N.J.	11	00.7
11.	Donald Godfrey, 16, Detroit, Mich.	9	17.8
12.	Carl Fries, 20, St. Louis, Mo.	9	30
13.	Bruno Marchi, 19, Medford, Mass.	7	20
14.	John Young, 20, New York, N.Y.	7	18
15.	Ira Fralick, 20, Syracuse, N.Y.	6	36.2
16.	Lewis Sutter, 16, St. Louis, Mo.	6	05.5
17.	Sanford Caplan, 17, Cleveland, Ohio	6	05
18.	Harold Foerster, 15, St. Louis, Mo.	5	46.4
19.	William Sherwood, 17, Orange, N.J.	5	25.5
20.	DeWitt Ross, Jr., 15, Tulsa, Okla.	5	22.5
21.	Vernon Boehle, 20, Indianapolis, Ind.	4	52
22.	William Ying, 16, Rosebank, Staten Island, N.Y.	4	18
23.	James Bohash, Jr., 16, Detroit, Mich.	4	08
24.	Donald Dodd, 15, St. Louis, Mo.	3	00
25.	Wallace Simmers, 16, New Lenox, Ill.	1	42

Indoor Contest for Cabin Fuselage Models, R.O.G. Open-Age Class for Shell Petroleum Trophy

Age limit—over 21

1.	Jesse Bieberman, Philadelphia, Pa.	6	41.3
2.	Robert Willoughby, Kansas City, Mo.	6	37
3.	John Dilly, Galt, Ontario	5	01
4.	Chester Lanzo, Cleveland, Ohio	2	10
5.	Louis Casale, Syracuse, N.Y.	2	01

Forthcoming Model Plane Meets

SEVERAL meets are planned for the summer months. The list below gives the place and approximate dates. Information may be obtained from the person named in each case.

August 17.

Indoor meet at Lakehurst, N. J., in the large dirigible hangar. No prizes but a chance to get some indoor practice and make record trials. Write to H. W. Alden, 1106 Edgewater Ave., Ridgefield, N.J.

August 17.

Outdoor meet at Galesburg, Ill. No information as to prizes available. Write to Mr. Julian Mack, Jacobi Bros. and Mack Co., Galesburg, Ill.

August 17.

Outdoor meet at Beloit, Wis. To be conducted by the Junior N.A.A. Chapter, Hangar No. 13. Write to Conrad Hansen, Jr., Y.M.C.A., Beloit, Wis.

August 29.

1935 New York State Championship Outdoor Model Airplane Meet. Under the auspices of the New York State Fair at Syracuse Airport. Good prizes and a good program of events. Write to Donald V. Shetland, Syracuse Model Airplane Club, Y.M.C.A., Syracuse, N.Y.

September 14.

Outdoor meet at Lebanon, Pa. Regular prizes and events. To be conducted by the Lebanon Exchange Club. Write to Gordon S. Light, 1404 Oak St., Lebanon, Pa.

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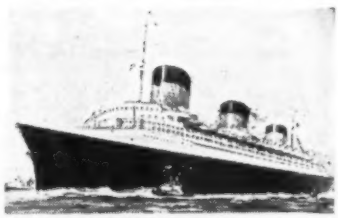

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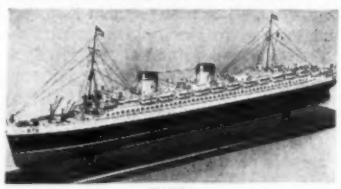

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29"—scale 1/32" to the foot. Patented Hull Design Shaped hull and over 100 metal fittings. 24 cast metal lifeboats; 24 cast stairways; 2 cast anchors; 4 metal propellers; 6 cast bits; 48 metal davits. The Rex comes in beautiful high luster original colors of black, orange, white, red and green; and the kit also contains turned wood parts, printed wood, cement, wood filler, sandpaper, etc. **postpaid**..... **$6.00**

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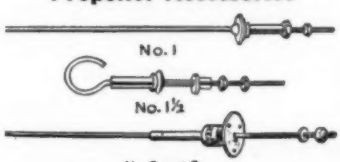

Increase the efficiency of the propeller by eliminating friction and you will get better, longer, swifter flights. IDEAL Propeller Shafts help the motor deliver more power to the propeller. Made in Ball-Bearing and Plain Styles, threaded and with all fittings included.

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9 inch	40c	each
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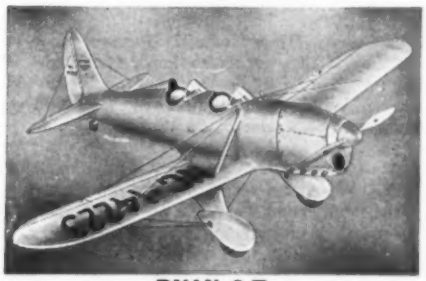
I feel that my success was due to the high quality materials and accurate plans in the kit. I hope to get another of your kits and make a much better plane for next year's Fair.
I am recommending the 'Super Detail' kits to all my friends and I hope I can gain more honors with my plane.
Yours very truly,
ROLAND WARE. (Signed)
Berlin, N. J."



RYAN S T

Wingspan 22½", length 16½", weight 2½ oz., scale ¾". New fast Ryan has dual control system which operates in either cockpit; adjustable wing flaps; plans for making an actual working engine—4 cylinders with movable pistons, carburetor and spark plugs. **Complete kit..** **$1.50**

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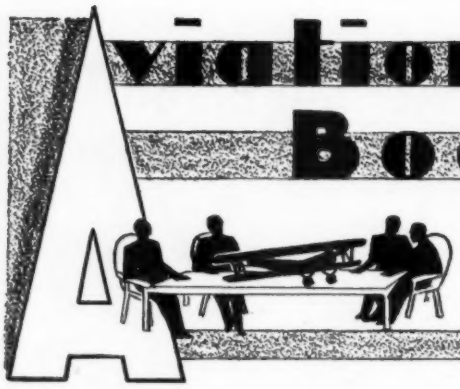

Aviation Advisory Board

Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U.S. Army

IN THE course of model building and flying, a great many questions arise in the minds of the followers of this hobby, the answers to which cannot be obtained from books in the library or through experiments. We have found that it has been a great help to model builders, to print the answers to many of the questions which are puzzling them In fact, if readers of the magazine will look through the pages of the Advisory Boards which have appeared in the past year or two, they will find that there is a complete aeronautical education which they may obtain by simply reading.

This month we have some very interesting questions which may be of great help to builders. Clinton Hiester of 1915 Parker St., Berkeley, Calif., wants to know the following:

Question: Where can I get a set of gears such as appears on Frank Zaic's Wakefield model, published in the August issue of MODEL AIRPLANE NEWS?

Answer: We advise you to write to several of the model companies who advertise in the pages of this magazine. Unquestionably they will be able to supply you. If you install a set of gears in your model do not expect unusual results, for as a rule, multiple motors in models do not increase the duration perceptibly. You may gain possibly 10 percent in duration. You must remember that adding gears and an extra motor increases the weight of your model and the sinking velocity considerably. We refer you to the instalment of the "Aerodynamic Design of the Model Plane," which appears in this issue. Many questions are answered about geared motors of this type in the article.

Question: I would like to know how to convert the rubber motor tables in the articles "Aerodynamic Design of the Model Plane" to correspond to a length of rubber 18 inches long, instead of 12 inches.

Answer: In order to determine the values of the number of turns and the amount of work that can be stored in any length of rubber, merely multiply the values in the table by the length of your motor which will give you the correct turns in inches and fractions of inches. Therefore, multiply the values of turns and work in the table by eighteen inches. The maximum torque of any motor remains constant whether the motor is two inches or twenty. The length does not affect it. The torque is only affected by increases in the cross sectional area of rubber used. In other words, if you add more strands or increase the size of the strands, roughly, the torque increases as $S\sqrt{s}$ where S represents the number of strands in the motor.

Douglas Turrell of 6952 South Fairfield Ave., Chicago, Ill., is very much interested to know:

Question: Does it mean that the chord line is parallel to the line of thrust when the wing is said to have zero incidence?

Answer: Yes, the angle of incidence is always the angle between the line of thrust and the chord line of the airfoil. Some airfoils have an arbitrary chord line parallel to the undersurface. The ordinates of the airfoil are given relative to this line in the Clark Y Section. However, this is not the effective chord line. The effective chord line is actually the line from the leading edge of the airfoil to the trailing edge. All aerodynamic effects should be calculated and compared relative to this latter chord line.

Question: How can you find the aspect ratio of a tapered wing?

Answer: The aspect ratio of any wing is the span of the wing from tip to tip, divided by the average chord. The average chord of a tapered wing may be found readily in the following manner:

Draw lines across the airfoil from leading to trailing edge parallel to the line of thrust. Space these lines approximately one inch apart. These lines may be drawn on half the wing only. This will save you work. Next measure the length of each one of these lines and add them together, dividing the sum by the number of lines. You then have the average chord. Better results will be obtained if you draw an extra line at the curved tip of the wing about half an inch in from the tip or halfway between the tip and the line nearest the tip.

David Zuckerman of 18 East 108th St., New York City, is evidently very much interested in World War aviation. He asks the following questions:

Question: What was the best American and German ship of 1915. 1916, 1917, 1918; that is, scouting and fighting ships?

Answer: There were no American ships on the "Front" during the years of 1915, 1916, and 1917. In 1918 a few American-built DeHavillands were used. It was not until the last part of 1917 that any American ships were at the stage of development where they could commence to be manufactured in large quantities. Some of these planes were the Ordinance Scout, Thomas Morse Pursuit Ship and the American-built Le Pere. However, these ships never saw service as the war closed before they arrived in France. The best German ships of 1915 and 1916 were the Fokkers. In 1917 the Albatros planes forged ahead. In 1918, the Fokkers, especially the Fokker D7, were the finest ships on the "Front," probably sharing equal honors with the Albatros planes.

Question: Why is it that most racing planes have their wings at the bottom of the fuselage?

Answer: When the wings are placed at the lower edge of the fuselage, the wings

(Continued on page 48)

1/3 ACTUALLY The SIZE OF REAL PLANES! 5 FOOT FLYING SCALE MODELS $1 EACH

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CONTENTS: Each of these new G.H.Q. Giant 5 ft. Model Planes contains full-size Plans, all ribs, formers and curved parts clearly printed on best grade Balsa. Large bottles Cement and Dope, different colors Japanese Tissue, Special Endurance Rubber, finished Ready-Cut 3" Wheels, Wire, Balsa strips cut to size, Washers, and . . . Movable Controls, shock-proof Landing Gear, Scale Details, Lettering, Numbering and Insignias, Flight Log, etc.

5 ft. Monocoupe

5 FT. STINSON RELIANT

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5 FT. HEATH PARASOL

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G. H. Q. Model Air Co., New York City. Jacksonville, Fla., April 27, 1935.

Gentlemen:—

Your postal 13th inst. rec'd and I thank you for the 5 ft. Kit you are sending for our contest. I am pleased to advise you that your 5 ft. Stinson won first prize yesterday at the Jacksonville Fair (Duval Co.). It was a wonderful job, in white, and won the Blue Ribbon over a hundred other models. I sold the kit to Dan Stormes who built it.

Yours truly,

W. L. TIMPONE,
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G. H. Q. Model Airplane Co., Wellsville, Ohio, May 28, 1935.
564 South Boulevard, New York, N. Y.

Dear Sir:—

Enclosed please find a money order for $1.35 for which please send me your 5 ft. Monocoupe. I have built your five foot Stinson Reliant and it turned out all right. I got flights of 900 feet from it. I want to build this monocoupe and see what kind of flights I get from it. Please send the Monocoupe as soon as possible, because I am anxious to get started on it.

Sincerely yours,
ROBERT TRUAX,
R. D. 1, Wellsville, Ohio.

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plus 20c packing, postage, insurance

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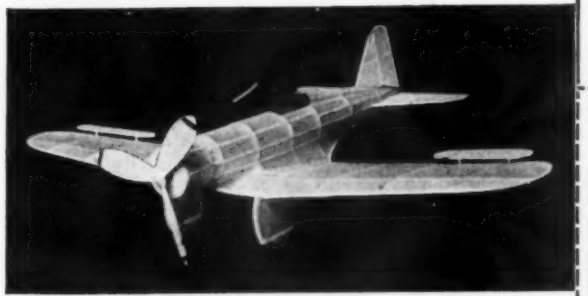

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Each 24" G.H.Q. Kit is complete in every detail. A liberal quantity of everything. 18 models to select from at 25c each.

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Douglas Mailplane
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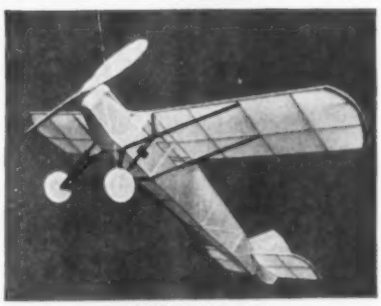

24" CURTISS ROBIN, 25c

Buy these kits at your dealer—order by coupon or letter

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Enclosed find $..... Please send the following kits as checked.

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- ☐ Fokker D-8
- ☐ Polish Fighter
- ☐ Monocoupe
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Is Germany Prepared in the Air?

(Continued from page 5)

German Air Defense Union (Deutche Luftverwehr Bund) with the idea of training people how to take care of themselves in case of an aerial bombardment. The German Air Defense Union trained its members to find shelters for themselves and others when the air-raid signal was given; how to spot oncoming bombers; engineers prepared plans for bomb- and gas-proof cellars and saw that the members built them; gas technicians developed new forms of gas masks and showed people how to use them; and the Union staged spectacular air-raid pageants all over Germany.

Meanwhile, most of the glider pilots who had jumped into that form of sport after the war, were growing up. After a year or two of gliding they showed a hankering to fly powered planes, and as a natural development of both their desire and the gliders they had used, German airplane builders began to turn out numbers of small sport planes. They were sturdy one and two-seaters, cheap in price, with low fuel consumption and no great speed, but capable of any amount of acrobatics, and of making quick hedge-hopping flights and landing in any sort of an emergency field. Now the Germans are naturally a competitive race; nothing was more natural than that there should develop a German Air Sport Union (Deutche Luft Verbund) which held sports meets every year with contests for all classes of planes and types of pilots.

Along about 1929 the French began to emit loud complaints that neither of these organizations was as innocent as it seemed. They pointed out that the DLV held contests for groups of three, six, nine, and eighteen planes flying and stunting together, and that curiously enough military air formations are based on groups of three, six, nine, and eighteen planes flying and stunting together. They said the latest German sports planes were practically identical in design with military pursuit ships, the only difference being that they had 135 and 150 hp. motors, whereas there were any number of 300-400 hp. motors in Germany that would fit into the same ships without serious structural changes. There were articles in the French papers about the German Air Defense Union. Why, they asked, was it necessary for members of the Union to fly around in "passenger" planes at every pageant, dropping dummy bombs on targets and flying in formation? Finally the French remarked that Anthony Fokker, the flying Dutchman who built so many of Germany's airplanes during the war, was just over the border in Holland, still building airplanes at a tremendous rate which it would be no trouble at all to fly over the line; and that German capital had a strong interest in the Aktiebolaget Svenska, whose factory at Linkoping was turning out a goodly quantity of warplanes, just across the Baltic in Sweden.

To all these accusations the Germans replied "How silly!" and there was nothing much the French could do about it unless they actually wanted to make war on Germany, which they evidently didn't. If anybody outside France believed in these complaints they didn't bother to say so. As a matter of fact, very few people paid them any attention, for in the years since the World War, aviation had advanced so enormously and specialized so, that it was no longer true that any plane could be a military plane. Warships of the air now demanded superchargers, armor, special bomb-racks, machine-gun installations built into the airplane, and a great deal of other special equipment that could only be installed on a commercial airplane by completely rebuilding it.

So things rolled along for several years more. And then, with the suddenness of a magician's trick, all the French complaints turned out to be true! On April 21st, 1935, Germany announced that she had a military air force in spite of the treaties, trained, equipped and ready, a force fit to compare with the best in existence. The announcement was made to take the fullest advantage of the historical and emotional value of the occasion, for April 21st is a date no German ever forgets. It is the anniversary of the death of Germany's greatest hero of the air, Baron Manfred von Richthofen; and when Adolf Hitler stepped to the rostrum of the Tempelhofer airdrome and flung up his arm on that historic day, a dozen fast fighters, brilliant with the red paint of the old Richthofen flying circus, soared up from the ground and swept over the cheering crowd in perfectly performed evolutions.

The question everyone has been asking since April 21st, the thing everyone in the world wants to know is—how good is this reborn German air service? How many planes are there and what types are they? How well trained are the fliers and along what lines of air strategy do they intend to operate?

The plain fact is that none of these questions can be answered fully and accurately. There is a censorship in Germany and it is good; very little information leaks through that the government does not wish to have known. Even the photographs of the new German air fleet that have come through have been retouched or were taken from such a distance that they do not show many details.

However, the tightest censorship cannot altogether prevent some leakages and the German air force has been the subject of intense interest on the part of a good many trained observers ever since it was announced, so that indications are not altogether lacking, and when they are pieced together they give us a fairly good picture of Nazi Germany in the air.

To begin with, the total number of ships has been given, from a number of sources, as about 80 squadrons. This makes the German air force numerically about equal to that of Italy and slightly smaller than that of France. In training and general efficiency, qualified observers place the Germans about on a level with those of France, ahead of the Russians and Japanese, behind the English, Americans, and Italians. They lack experience in high-speed ships and in altitude flying and dives—in other words they lack the kind of training that makes first-rate pursuit pilots. On the other hand, there are no better formation fliers in the world than these

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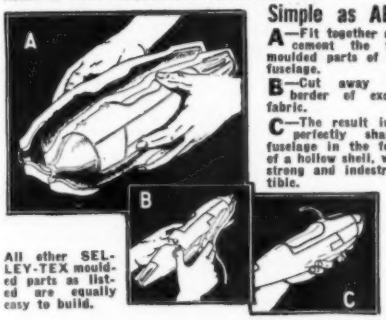
WACO D MILITARY. A wealth of military detail characterizes this formidable prototype of the latest Army innovation, and what a flyer!

The SELLEY-TEX moulded parts included in this kit are shown at the right. These together with special parts and materials as listed complete this outstanding value.



Simple as ABC

A—Fit together and cement the two moulded parts of the fuselage.

B—Cut away the border of excess fabric.

C—The result is a perfectly shaped fuselage in the form of a hollow shell, very strong and indestructible.

All other SELLEY-TEX moulded parts as listed are equally easy to build.

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WACO C CABIN. A masterpiece of authentic model design, incorporating every scientific feature to insure maximum flying performance.

Fully detailed SELLEY-TEX moulded fuselage, bulkhead, balancing ring, cowl, cowl bumps, pants, pants fairing and a special full-scale 9-cylinder motor, with metal push-rods and a special moulded celluloid cabin windshield; the many special scale parts and materials as listed complete this amazing value.

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GOSHAWK. A powerfully attractive flying scale replica of the speedy Navy fighter and accurate to the minutest detail.

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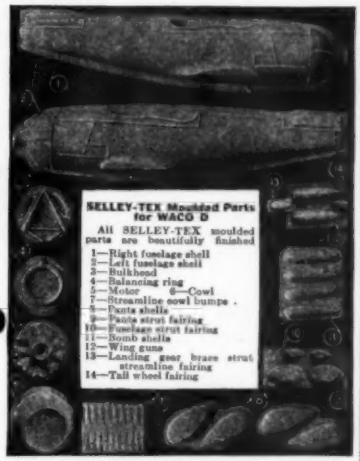
The manufacture of moulded parts takes more time, finer materials and more skillful workmanship, but it does make PRACTICAL construction sets!



LISTED PARTS AND ACCESSORIES

Packed in a beautiful, sturdy box with finished scale flying, adjustable pitch metal prop, finished propeller shaft and rear hook, turned wheels, with brass bushings, ribs printed out accurately on white sheet balsa, many special turned wood parts, finest grade of balsa wood, sticks, tail wheel and fork fittings, control horns and wire, pure para rubber, special bamboo paper, authentic markings, colored insignia, best quality cement, colored dopes, full-size easy-to-understand plan, complete with all picture details. All the tools necessary to build model:

CLAMPS—RAZOR BLADE, BRUSH, SANDPAPER

ALL 24-INCH WING SPAN

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5⅝" ..40c	6½" ..70c	4½" ..25c	5" ..45c		
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same Germans and they are unsurpassed as makers and users of precision instruments. Translated into the terms of a military air service, this means they have a large number of first-rate bombing and observation pilots, that they are aces at night and blind flying, and that a German bombing squadron, even without pursuit aviation to protect it, will always be formidable. The large number of former glider pilots and sportsmen among them also makes them particularly dangerous adversaries in a dog-fight, even when their machines are not of the best.

As to their pursuit ships, there is very good reason to believe that their machines are not of the best. It was comparatively easy to build bootleg bombers and observation ships on commercial lines, but difficult to build good pursuit. The Germans do not seem to have many pursuit ships and those in service bear little resemblance to the fast Grummans, Hawkers, Boeings, and Mureaux. Those in the reconstituted Richthofen circus are biplanes along the lines of the Swedish Jaktfalk (it would not be surprising to hear that some of them were built in Sweden) with N-struts, crossed drift-wires, narrow chord ailerons, and a radical motor, probably a Siemens. They have one highly remarkable feature —they are all-metal, the only instance of this type of construction in the world's pursuit fleets. As to performance absolutely nothing is known; if they are like the Jaktfalk in this respect, they are comparatively slow for pursuit ships (with a top speed around 215 m.p.h.) but excellent acrobatic machines, which would be in line with German wartime traditions in air fighting. There is also an unverified report that some of the Curtiss Hawks sold to various European countries have made their way into Germany.

The trainers and observation machines are largely Focke-Wulf, Heinkel, and Arado models, biplanes of no special peculiarities, but stout and very reliable. These types have been in existence for some time for training and sports purposes. The Arado alone is remarkable for its tail assembly, which features elevator and fin entirely separate from each other, the elevator appearing far in front of the fin in some types and far behind it in others. The Arado also has a sharper sweepback than is usual.

It is among the bombers, however, that the Germans have made real advances. Their Heinkel 70A is a magnificent job, reminiscent of a Lockheed in its general lines, a low-wing monoplane with retractable landing gear and a liquid-cooled engine, a ship that can walk off with 2200 pounds of useful load at a speed of 235 miles per hour. A ship like that makes a really powerful day bomber. Behind it are a number of Junkers types, especially the prodigious G-38 model, a four-motored job, not fast, but with a ten-ton useful load and endurance enough to carry it across the Atlantic. If the Germans have any all-round fighters like the French Amiots and Breguets, or any attack craft, the news has not yet escaped the censorship.

From this background, it is possible to build up a general picture of German air strategy. It is first and foremost a strategy of quick-bombing offensives. No city in Germany is more than a few hours flight from at least two possible enemy countries. This makes Germany peculiarly vulnerable to bombing attacks from other nations, so vulnerable that the Germans have apparently decided that it is hardly worth while attempting to set up a defense in the air. The German Air Defense Union now contains 5,900,000 members, more than a tenth of the entire population. It teaches these members not to depend on German ships beating off enemies in the air, but to put on their gas-masks and run for the cellar when the bombers come. Incidentally, it also contains 280,000 "armed" members, which means members trained in the use of anti-aircraft artillery and machine guns, and German scientists have been working overtime on the production of new types of quick-acting camouflage smokes to hide objects on the ground from hostile bombing planes. It is probable that the Nazis have one of the best ground defenses against air attack in the world, but it is a ground defense only, designed to make enemies waste their bombs.

On the other hand, Germany's central position gives her advantages for air attack that compensate for the difficulties of the defense. With her huge force of bombers, she can well, and probably does, count on getting into the air first and bombing the hostile airdromes to bits before the enemy can get started. At all events, she is sparing no expense or trouble in making the country air-minded, and the fact that the air is considered the first line of defense is sufficiently proved by the appointment of Goering, Germany's No. 2 man, Hitler's first aide, as Minister of the Air.

How to Build a Twin Amphibian

(Continued from page 21)

it is better to complete the motor tubes.

Motor Tubes

Soak a piece of flat balsa 1/32"x2"x18" in hot water until pliable, then wrap it around a piece of ½" diameter dowling. Bind the balsa firmly with tape and allow an hour to dry, then unwind the tape, remove the dowling, overlap the edges of the balsa and cement. Don't attempt to cement the balsa while it is wrapped around the dowling or you won't be able to remove the dowling after the cement has dried. This process is repeated in making the other balsa tube. Square up the ends of the tubes and carve nose and tail plugs from balsa. Insert the rear rubber hook through the plug and bend the end into a circle that will fit directly on the winder. A punched clothing snap cemented to the nose plug serves as a propeller bearing.

Join the two motor tubes with two pieces of bamboo 1/16"x3/16". The ends of these bamboo braces should be bent to a circular shape to fit around the tube. Be sure the tube centers are 8 inches apart. Then attach the braces to the motor tubes one inch from each end. Bamboo braces support the motor tubes above the float. The front supports fit to the side of the body at former "D." The rear support is bent from one piece of bamboo. It is V-shaped, the bottom of the "V" being cemented to the top of the float at former

"G." The motor tubes should be just high enough above the float to permit an 8" propeller to turn freely. Be sure the rear of the motor tubes is one inch higher than the front, taking the middle longeron of the main float as the basis for this measurement.

Landing Gear and Float Assembly

The float and wheel are hinged so that the wheel can be swung into position for land flying and raised for water flights. The wheel or float is held in position by a wire arm clipped to the strut. The detail drawing will explain this better than words. No. 14 wire is used. Be sure that both small floats are the same distance from the main float. Adjustable wire struts will make it possible to raise or lower the floats. These adjustable wire struts are made by coiling the ends of two pieces of wire around each other. Make the joint fairly tight so you can make accurate adjustments in the positions of the side floats. The ends of these adjustable struts are fastened to the balsa motor tubes.

You might have difficulty in telling from the drawing how the landing gear is built. Here is a brief description: Two U-shaped pieces of wire are fastened to the body. To the bottom of each "U" attach the adjustable struts, the other end of these struts being attached to the motor tubes. Two V-shaped pieces of wire serve as landing struts. The bottom of the "V" serves as a wheel axle. The ends of the "V" struts are bent around the bottom of the "U" piece, and then cemented to the small floats. The one end of the "V" piece is extended and bent to form the arm that holds the float or wheel in position. The ease with which you can change from land to water flying with this device makes it well worth all efforts to understand it. Balsa wheels 1¼ inches in diameter are slipped on the axle. Paper bushings are cemented to the wire axle and cemented inside the wheel to permit the wheels to revolve more smoothly.

Propeller Carving

Carve one right and one left-hand propeller. The size of the block is 1"x1⅛"x 8". The drawing will make clear the steps in this procedure. If you have a favorite size block or your own method of carving the propellers, be sure to use it. The only important requirement is that the propellers have the same area and pitch as the ones in the drawing. However, the method shown in the drawing produces one of the most efficient model airplane propellers. Insert a shaft through the nose plug and slip several washers on the shaft and then slip on the propeller. Bend a "U" in the end of the shaft and pull it back into the propeller and cement. Looking at the model from the front the right-hand propeller is on the left side. When the model is flying the props should turn up and out.

Wing and Elevator

The wing and elevator are made in the conventional way: 5" Clark-Y section is used. The drawing will make clear all details. Build 2½ inches of dihedral into each side of the wing.

The elevator is built just like the wing. The full-size rudder is shown and these are cemented to the elevator 8 inches apart so they will be directly above the motor tubes when the model is assembled. Place small balsa blocks under the trailing edge of the elevator to set it at zero degree incidence.

The wing can be built any way that you wish. Just make it strong, use the Clark-Y section and have the specified area. Cover the wing, tail, and top of the main float with a strong grade of tissue and give several coats of dope. A light coat of varnish will protect the floats and help waterproof them. Don't neglect to give the motor tubes a coat of dope. Every part of the model should be protected from the water.

Assembly and Flying

The wing is held to the motor tubes by two rubber bands in the same way as a twin-pusher wing. Attach the elevator the same way. The rear edge of the elevator should be about one-quarter inch from the rear end of the motor tubes. The location of the main wing depends on the balance of the model. It should balance at one-third the wing chord. On the original models the wing position was about 3 to 4 inches from the front of the motor tubes.

Eight strands of rubber are used on each motor. This might vary depending on the weight of your model. Glide the model to check on the wing settings and then wind the motors. It will be necessary to wind them one at a time. Have someone count the number of turns with you

and in that way check to see that the same number is stored in each motor. Take pains to see that you wind the motors in the opposite directions.. You will be tickled by the first flight—almost straight up, leveling off at the top of the climb, and then when the power is gone the model will come down in a flat glide. The big hull seems to cushion the air and the crate slowly comes to earth.

Now for the thrill—off the water. Pull up the wheels and adjust the side floats. The bottoms of the side floats should be even with the bottom of the center float. Put the model in the water and see that the wing is level and that the model rides with the rear of the main float well down in the water. For a starter, put 300 turns in each motor and then hold the model level in the water, release the propellers. If you have followed directions the model should gather speed and after a 15-foot run leave the water going up in a steep climb. The landing on the water is an easy "plink" with a few ripples.

If your model will not take off, add a few more strands to each motor. Try adjusting the side floats at a greater angle. As a last resort throw some stones into the water and launch the model while the ripples are spreading. This is an old Navy trick. Before the Navy flying boats could take off on their recent flight to Hawaii, it was necessary to stir up the water of San Francisco Bay with other seaplanes. If your model is built according to the plans you won't have to throw any stones, but can fly it from a calm mill pond even if there is no wind blowing.

On the Frontiers of Aviation

(Continued from page 9)

speed is 176 m.p.h.

The Bellanca Aircraft Corporation has been negotiating in England for the constructing of Bellanca planes in that country.

The new Sikorsky S-43 for Inter-Island Airways of Hawaii has successfully undergone flight tests at Bridgeport, Conn. Details of the amphibian have been published in former issues of this paper. Other features of the plane not heretofore published are as follows. The statically balanced ailerons may be dropped 10 degrees when landing to act as additional flap area. The fairing between the wing and the hull is nonstructural and may be removed for access to control cables. Therefore, the "N" struts between wing and hull must carry the entire lift of the wing.

Next month will be published in this article details of the various gliders that participated in the annual soaring meet at Elmira, N.Y., which will include a four-place glider and several two-place gliders —also some startling news of a new Sikorsky!

Arthur Hiller of New York City writes us that North American Aviation, formally known as General Aviation and B/J, has once more entered the three-place observation plane field. The new plane is a mid-wing of the type employed on former observation planes built by the company. A Pratt & Whitney 800 hp. Hornet is the power plant. The airplane, which has a span of 43 feet, is expected to have a speed close to 250 m.p.h. A new type retracting device has been incorporated in its design.

A new plane to be present at the National Air Races is the small racing plane built by Riley Burrows. The plane has a high speed of 212 m.p.h. and was recently equipped to carry enough gas for a 1500-mile flight. The racer weighs 500 pounds and is of metal tube construction with the wings and fuselage welded together into a single unit. The power plant is a 120 hp. Martin 333. The landing speed is 40 m.p.h., which has been made possible by the use of flaps. The ship has recently been overhauled at the Curtiss-Wright Technical Institute of Aeronautics at the Grand Central Air Terminal, Glendale, California. (See photo, page 13, February issue of M.A.N.).

One can now purchase a twin-engined plane for $2,000! W. A. Hammond and G. B. Fuller have developed a two-place low-wing monoplane powered by two Szekely of 45 hp. each to sell at this low price. The passengers sit side-by-side in a cabin with excellent visibility. The span is 34 ft. 6 in. Special features include combination split and flap type air brakes, Flettner tabs, hydraulic shock absorbers, air wheels, inside baggage compartment, and is optionally equipped with wheel brakes. When the door of the cabin is opened the roof automatically rises to allow plenty of headroom on entering.

Top speed is 117 m.p.h., cruising 100 m.p.h., and landing speed with brakes is 40 m.p.h. The normal take-off time is 10 seconds, and the rate of climb is 800 feet per minute. Cruising on one engine may be maintained at 2,000 feet altitude.

The present engines are to be substituted

by 65 horsepower inverted in-line engines of new design. The first plane built is of wooden and metal tubing but those that are to follow will be of all-metal stressed skin construction. John M. ("Slim") Menefee has been test-flying the ship at the Dycer Airport in Los Angeles, Calif.

How to Build a Solid Wood Scale Model of the Curtiss-Wright Courtney Amphibian

Plans Page 10

Balsa wood should be used throughout in the construction of the model. Get dimensions from plans for purchasing material. A tube of ambroid and a can or bottle of silver dope is needed for constructing the model.

The tools necessary are a chisel, razor blade, paint brush, coarse and fine sandpaper and jig-saw, if available.

The plans may be squared off by connecting the corresponding dots at the borders with straight pencil lines. Each square equals one square foot.

Draw outline of side elevation of hull on stock and cut to shape with chisel or jig-saw. Then draw top elevation and cut again. Shave down the sides of the hull and round off the top with your chisel as shown by cross sections. Go over all surfaces with coarse and then fine sandpaper.

Make upper and lower wings in same manner. Draw top view and cut with razor blade and then taper off the tips. Shape out the airfoil by referring to the airfoil section. Sandpaper the wings thoroughly. Cut out a groove in center of top wing for engine cowling and nacelle, which is made next.

Draw top view of engine housing and cut and then draw the side view and cut. A cross section is shown in front elevation of model. A razor blade should be used in making this part of the model. Sandpaper thoroughly. Cut out a prop from scrap wood with a razor blade and, using a straight pin as a shaft, join it to the end of the engine housing.

Shape out the tail units next with your razor blade, referring to cross sections. Sandpaper these pieces also. Draw line separating fin from rudder and stabilizer from elevators. Also draw lines on the wing outlining the ailerons.

Shape out the wing floats and cut all the wing, landing gears, and tail struts from strips of balsa wood. Sandpaper to smoothness.

The wheels may be made or purchased. Begin the assembly of the model next.

Lay the hull on a smooth flat surface and join the lower wing halves to it, applying plenty of ambroid. Lay blocks under the wing to hold it in place. When joints have thoroughly dried, ambroid struts in place that hold the engine nacelle and cowl and join the engine housing to them when connections at hull have dried. Connect the halves of the upper wing to the engine housing and ambroid all wing struts in place.

Connect fin and rudder piece to tail of hull and add the two stabilizer and elevator pieces to that. Ambroid the two tail struts in place.

When connections have dried, turn model on its back and connect wing floats to lower wing tips, applying plenty of ambroid. Then build up landing gear on hull. Make this part of the model very strong.

Go over the entire model with fine sandpaper and then brush off all dust. Give the model one coat of silver dope. Sandpaper the model once more with fine sandpaper and then apply several more coats of dope, allowing one coat to dry before applying another. Four or five coats of dope should be applied before a very smooth finish is obtained. Paint the windows white if you wish. The model will then be completed.

The Aerodynamic Design of the Model Plane

(Continued from page 11)

with, which makes the multiple-series-motored model 107% heavier than the single-motored model.

In other words if a single-motored model weighs three ounces, a multiple-motored model of the same size and proportions will weigh 6.21 ounces. Peculiarly enough these figures check almost exactly with the weight of one of the American Wakefield entries which employed this system of multiple motors. In fact its weight was slightly more than 6.21 ounces. A single-motored model of the same proportions could have been made with only three ounces of total weight.

What of the duration of this heavier plane? Whereas eight strands would fly the single-motored ship, we find that at least fourteen strands in each of the two motors is required to fly the multiple-motored plane, even though there has been no allowance for loss of power due to gear friction.

Suppose we calculate first the relative number of *turns*, that can be stored in each of the two power plants considered, the *eight*-strand single motor one and the *fourteen*-strand two-motor system. The number of turns, (T) is approximately inversely proportional to the square root of the number of strands used in a motor, so (T) for an eight-strand motor equals $K\sqrt{1/8}$ and (T) for a fourteen-strand motor $=K\sqrt{1/14}$. Solving, $T_8=K\ (0.353)$ and $T_{14}=K\ (0.267)$. (K) merely indicates proportion. For every 100 turns that can be stored in the eight-strand motor, $\frac{267\times100}{353}=75.6$ turns can be stored in each of the fourteen-strand motors. Therefore, in these two motors together, $2\times75.6=151$ turns may be stored. This is 51% more turns than can be stored in the one eight-strand motor.

However, the geared motor machine will fly faster due to its greater weight. We have found that its weight is 2.07 times the weight of the single-strand ship. Also we know that the square of the speeds of each of the planes will be proportional to their respective weights. Therefore, for the eight-strand plane, $V^2=K1$, or $V=K\ (1.0)$ and for the fourteen-strand plane $V^2=K\ (2.07)$, or $V=K\ (1.44)$. Thus it is found that the speed of the multiple-motor plane is (1.44) times the one-motor ship; that is, it has a speed 44% greater. In simple terms this means that the propeller of the multiple-motor model turns 144 times while the single motor plane's

propeller turns 100 times.

Now if both types of power units are wound to capacity and the eight-strand motor will turn for one unit of time, the fourteen-strand motors will turn for $\left(\frac{151}{144}\right) = 1.05$ units of time. In other words, the geared motor will have a duration which is 5% greater.

There is another important point to consider, however. The geared motor plane being faster, will have a greater sinking speed, even if the gliding angle is the same. Actually the geared motor plane will glide only about 70% as long as the lighter model, provided they both reach the same altitude when the motor has completely unwound. If the gliding duration is one-third of the total flight time for the eight-strand ship, the total flight duration is (100) + (50) or 150 units of time. Then the gliding time of the geared model will be $(\frac{2}{3} \times 50) = 33\frac{1}{3}$ units and its total duration will be $(105 + 33\frac{1}{3})$ or $(138\frac{1}{3})$ units of time. This means that the duration of the geared job is, $\left(\frac{138.3}{150}\right) = 0.766 = 76.6\%$ of the single-motor plane duration

If model builders experiment with the geared type of model to any extent they will realize that the reasoning and figures set forth here are fairly accurate. Comparing flight for flight with those of the single motor and gear models, the duration of the geared plane will be less invariably than the single-motor job.

There is an arrangement of gears, however, that may be used which will reduce the tendency of the motors to twist the fuselage and thus will allow the fuselage to be built lighter. Of course any reduction in weight will increase the duration so it is well to consider this case. The duration will be increased approximately 10% to 15%, which is considerable.

This system of multiple motors is the same as has just been described with one exception. Instead of having the two gears at the rear ends of the motors mesh directly with one another, an idling gear is placed between the two motor gears meshed with them. With this arrangement the motors may be wound in *opposite* directions and thus the torque of one balances the torque of the other. Under this condition there is no twist on the fuselage though there is added weight of the extra gear. This is insignificant, however, compared to the reduction in the weight of the fuselage which may be effected.

Twin Motors and Propellers

There has been much speculation among model builders concerning the relative merits of single propeller stick tractors and twin propeller "jobs." The answer to these questions on this subject may be obtained through experimentation with actual models, however, a great deal can be learned by analyzing the problem and studying the factors involved in the case of each type.

Suppose we run it through our "dissecting machine" right here. First, we will suppose that we have a stick model driven by an *eight*-strand motor turning a single propeller, the whole model weighing about two ounces. We wish to build a twin-propeller model of the same main wing area and total weight, but with two motors, one motor driving each propeller. For the sake of accuracy in comparison we will assume that the two models are of the same type, either both pushers or both tractors. In this way the relative values of two motor systems in themselves alone, can be determined.

First, under these conditions it is apparent that the total thrust of the two motor system must be equal to the single motor unit. The sum of the torques of the two motors must, therefore, be equal to the torque of the single motor of eight strands.

From previous considerations we know that the torque is proportional to $S\sqrt{S}$, where (S) represents the number of strands. Then (Q), the torque $= K(S\sqrt{S})$. For the eight-strand motor, $Q = 8\sqrt{8} = (22.48)K$. Therefore, *two* times the torque of *one* of the motors in the twin-motor system must equal (22.48), or $22.48 = 2(S\sqrt{S})K$, where (S) is the number of strands in *one* of the twin motors. The formula may be written $\sqrt{S^3} = 11.24$. Squaring and then taking the cube root of both sides of the equation we have, $S^3 = 126.3$, or $S = 5.02$.

This means that each motor of the twin-motor system should contain *five* strands, in order that the sum of the torque (propeller turning effort) of the two motors should be the same as the eight-strand motor.

Now let us see how many turns can be stored in each of the *five*-strand motors compared to the *eight*-strand unit. In the eight-strand motor, $T_8 = K\sqrt{\frac{1}{8}} = K(0.357)$. In the five-strand motor, $T_5 = K\sqrt{\frac{1}{5}} = K(0.448)$. As $(0.448) = 126\%$ of (0.357), the duration of the five-strand motors, each operating a separate propeller at the same time, will be 26% greater than the eight-strand one. That is of course, provided the propellers are designed to give the same thrust as the single propeller plane, and to turn at the same revolutions per minute. In order that this should take place, the twin propellers should have the same diameter and pitch, but each should have one-half the blade area of the single large propeller. This may be assured by cutting the twin propellers from blocks of the same length but of one-half the depth and one-half the width.

It is interesting to note that in the twin-propeller, twin-motor arrangement the increase in duration is about equal to the increase in the amount of the rubber used. That is, in the single motor plane, *eight* strands are used. In the twin-motor model two five-strand motors are used which gives a total of *ten* strands. This is equal to 25% more rubber than the eight-strand motor contains.

Builders through experience will realize that as a rule the duration of a model will be proportional approximately to the amount of rubber used, provided that in all cases compared, similar propellers, wings, weights and lengths of motors are employed. The duration will vary, of course, with any change in these factors.

The increase in duration of 26% is based on the fact that the twin-motor plane is the same in weight, has the same wing

area and motors of the same length as the eight-strand single-motor model. Now let us see what the twin-motor model arrangement contributes or detracts from the duration of a model through the *type* of construction required or any change in the required arrangement of the parts.

First, the motors are 25% heavier than the single-motor unit. This means that the plane as a whole is about 5% heavier due to the extra motor weight as 25% of 20% is equal to 5%. However, the V-frame used to carry the twin motors is as light or slightly lighter than the single stick required for the eight-strand motor. A V-frame for two five-strand motors 24" long may be made from two ⅛"x¼" medium balsa sticks when properly braced while a single balsa stick strong enough to carry an eight-strand motor 24 inches long should be about ¼"x½" in order to take the tension and *twist* of the motor. The twist in the twin motor unit is balanced by the motors being wound in opposite directions. This motor stick of the single motor weighs twice as much or possibly only 180% of the two V-frame sticks, if the single stick is tapered at the ends. At any rate, it is not illogical to assume that the twin motors with the V-frame do not weigh more than the single motor and its stick. Part of the extra weight of the single-motor stick will be balanced by the bracing required in the twin-stick V-frame construction.

If both types of models are to be tractors with landing gears their weights will be about equal for the tail planes, and wings will be of the same size and weight, the two propellers of the twin will be the same or less in weight than the propellers of the single motor tractor and the landing gear will be about the same weight, as well as the motor units with the frames.

However, if a twin pusher is considered, the frame and motors may be lengthened about 20% and yet keep the weight of the model the same as the tractor because a twin requires no landing gear. In other words, the weight saved by not using a landing gear may be put into longer motors and frame. This means 20% greater duration for the twin which gives a total of 146% of the duration of the single-propeller tractor.

The twin not only has this advantage but the elevator of a twin pusher actually gives considerable lift over that provided by the main wing. This insures greater possible altitude with a twin pusher. There is a great disadvantage to this type of model, however. Though it may perform better while under power, its gliding qualities are very poor compared to the tractor and actually, during the greater part of record flights, the model is gliding or soaring. Whereas the twin pusher gains advantage when under power, it loses this advantage and possibly a little more during the gliding part of the flight. If, however, a twin pusher can be designed that is steady and has unusual soaring qualities, then without question it will have much more flight duration than the tractor.

Next month an important phase of model plane power units will be considered. It is the *application* of power to secure the most efficient results. Don't miss this.

Secrets of Good Model Building

(Continued from page 7)

A nose block is also used on this type of assembly and may be put in place the same as was described for the last type of fuselage.

The same type of fuselage may be constructed quite a bit easier and more accurately by first assembling the formers on a "backbone." This is simply a strip of fairly thick balsa, about ¼", with slots cut along the upper edge into which the formers slip tightly. They may be very lightly glued to hold them, or pins may be used. The formers must, of course, be accurately lined up, but once this is done the addition of the stringers is a simple matter. The same precautions must be taken to shape the stringers, for when the assembly is complete and the heavy backbone removed, warping is quite probable if the stringers pull unevenly.

Still another way to make this type fuselage has lately been developed. This consists of making the formers in halves, splitting them vertically through the center. The half-formers are then fastened over the drawing to a board by means of pins and the stringers added. If the fuselage is nonsymmetrical on top and bottom, as most are, two separate drawings are needed, one for each side, so do not make a pair of lefts or rights. The two completed sides are then glued together, the surfaces of the formers being sufficient to give the necessary strength.

This last described system is probably the easiest for the beginner since, if there are no radical curves in the fuselage surface, the stringers need not be pre-formed. It is also the quickest because all the stringers may be glued in place at once.

The next article will continue the fuselage discussion with a complete description of the hollowed-out balsa fuselage, which to this writer's belief, is the most realistic construction possible and, contrary to general belief, one of the easiest and quickest to build.

Look for the October issue of *Model Airplane News* on sale at your local newsstand September 8th.

Building a Flying Waco Cabin Model

(Continued from page 13)

rudder with separate pieces of tissue. The surfaces may be lightly doped.

The completed units are attached in the designated positions. Please note that the stabilizer has ½ degree positive incidence.

The position of the thread bracing is given on the plan.

Wings

Pin the spars of 1/16"x1/8" to the bench. Using the patterns given, cut all the ribs from 1/32" sheet and cement in the proper locations. The leading and trailing edges are 1/16"x3/32". The curved portions of 1/20" sq. bamboo are bent by candle flame to the required shape and attached. The inner rib of the lower wing panels is slanted for dihedral. The front spar of the upper wing is cracked in the middle and cemented for dihedral. Small pieces of 1/16" sq. are used in the center of the upper surface to retain the proper dihedral.

Cover each side of both upper and lower wings with separate pieces of tissue. The finished covering may be lightly sprayed and doped.

Glue the center section struts to the fuselage as shown on the front and side views. The front strut is ⅛"x¼" and the rear 3/32"x3/16". Fasten the upper wing in place on the center section struts. The lower wings are cemented to the fillets. Use pins to hold the work in position until the cement dries.

The rear interplane struts are cut to size from 1/16"x3/16". The others are 1/16"x1/8". They are attached in the positions shown on the wing plan and the front view.

Motor and Cowling

The cowling is built up of ¼" sheet. Six circular pieces are cut out as shown on the side view and cemented together. Their sizes are also noted on the front view. When dry, shape to the required contour and smooth with fine sandpaper. The finished cowl is cemented to former D.

The crankcase is cut to shape from a block 11/16"x5/8". The cylinders are nine in number and their sizes are detailed on the plan. The cylinders are cemented to the crankcase as shown on the front view. Drill the crankcase to receive the shaft and glue a ⅛" washer to the front to serve as thrust bearing. The motor is detachable and serves as a plug to permit the use of a winder. Using the pattern given, cut the propeller blank from a block 6¼"x1¼"x⅝". The carving is done in the usual manner. Careful balancing is necessary as any vibration is injurious to the performance of the model. Bend the front of the shaft and imbed in the face of the propeller. Glue a ⅛" washer to the rear of the propeller, slide a loose washer and the crankcase on the shaft and bend the rubber hook. The maximum power required is six strands of ⅛" brown rubber.

Flying

If possible test the plane over deep grass or R.O.G. on a few turns. As the correct balance is attained, the number of turns may be increased. In the event that your model through some variation in construction needs balancing, a small weight may be added without affecting the performance. It is a picture when in full flight and impresses one with its consistent performance. When winder wound, this model will consistently fly 300 to 350 feet.

Bill of Materials

1 1/32"x2"x36" sheet balsa, bulkheads, formers and ribs.
8 1/16" sq. balsa, stringers and tail surfaces.
3 1/16"x⅛"x36" balsa, interplane struts, wing spars and miscellaneous.
2 1/16"x3/32"x36" balsa, leading and trailing edges.
1 1/16"x3/16"x12" balsa, interplane and landing gear struts.
1 ⅛"x¼"x6" balsa, center section and landing gear struts.
1 ⅛"x⅜"x4" balsa, landing gear struts.
1 3/32"x3/16"x½" balsa, center section strut.
1 ¼"x2¼"x12" balsa, cowling.
1 11/16"sq.x⅝" balsa, nose plug.
1 ¾"sq.x1" balsa, cylinders.
2 ⅜"x1"x2⅜" balsa, pants.
4 1/16"x1"x2⅜" balsa, pants.
2 3⅛"x¾"x1" balsa, wing fillets.
2 1"x¾"x5/16" balsa, lower landing gear fillets.
2 ⅜"x¼"x3/16" balsa, upper landing gear fillets.
2 1/16"x1⅜"x¾" balsa, rear hook bulkhead.
1 3/16"x2½" sq. balsa, former.
1 6¼"x1¼"x⅜" balsa, propeller.
2 1/16"x¾"x12" bamboo, edges and landing gear struts.
1 ½ oz. cement.
1 1½ oz. clear dope.
2 white superfine tissue.
1 6" .022 music wire.
1 2" .014 music wire.
1 small piece of cellophane.
3 ⅛" washers.
1 4¼ ft. ⅛" flat brown rubber.
Black thread, flying wires.
Black lacquer, trimming.
1 ¾" tail wheel.

A Silhouette Monocoupe Glider

(Continued from page 17)

cement the lift struts in place, letter H. The outer ends are cemented to and underneath the wing rib as shown in the front and side view drawings. The brace struts, letter J, are then cemented in place. Four are needed. The rear ones are glued directly behind the front two. There are two stabilizer brace struts, letter K, one cemented on each side of the vertical fin to the stabilizer, and four under stabilizer struts, letter L. These are cemented at contact points of the fuselage sides to the undersides of the stabilizer.

The wire launching hook is shaped from a small piece of thin hair pin wire to the shape shown and cemented underneath the fuselage. This comes into use only when the model is launched with a simple sling shot.

For the nose weight, use a piece of heavy silver wrapping or lead foil. This piece is cemented in place on the cowling, letter P. After a gliding test, indoors and out, you will be able to determine the maximum weight to leave on permanently.

The color scheme for the Monocoupe is taken from the one used on the model shown in the photograph accompanying this article. The leading edge of the wing both on top and on bottom is dark blue. After that international orange. A thin white line divides the colors. The tail assembly is orange with dark blue striping. The fuselage is blue with striping on the cowling and body sides in orange bordered with white lines. All struts are white with blue striping on the wheel pants.

The propeller is used for show only and should not be mounted when the model is launched by slingshot.

Air Ways—Here and There

(Continued from page 19)

K.A. Pouch of 83 Low Terrace, New Brighton, N.Y. It was made one-fifth the size of the real ship and weighs three and a half pounds with the motor. It takes off and lands at ten miles per hour. It is certainly an unusual-looking job.

Picture No. 8 shows the framework of a K.G.-3 built by Arthur Marcello of 557 Maple Ave., Barrington, R.I. The plans in MODEL AIRPLANE NEWS specified a wing span of eight feet; however, Marcello has lengthened them to ten feet. This ship is similar to the world's record job. The picture illustrates clearly the detail that a builder may incorporate in this type of ship. In fact, a gas motor model must have the same type of construction as its "big brother" in order to be durable yet light. A great deal can be learned by young men who take up this pastime.

William Heermance of 14 McAllister Arcade, Miami, Fla., makes a distinctive contribution with picture No. 9. This shows his 6½-inch Fokker D8 Monoplane, mounted on a cigar box. The picture gives a good idea of the actual size of this ship. The model is made with all accessories and details to scale and has flown many times for more than thirty feet. This does not sound like a great distance, but for a ship of this size it is considerable. Heermance says,

"It is the most successful of several models of this type I have built. Owing to the fact that it is not a so-called "barn door" it will glide and after the power cuts off it will come in for a nice landing."

No one need be ashamed of building and flying model airplanes. There was a time when model builders would slink through alleys and through many little byways while carrying their models to some remote field for trials. At one time the average person thought that model airplane building and flying was "child's play" and the so-called "model builder" easily acquired the name of "sissy" among his friends who were not mechanically inclined and did not understand the scientific study necessary to build a successful ship. It has been only recently that older people and adults connected with the aviation industry have realized the value of model building. Incidentally, *young* men have realized it for a long time. Model builders cannot help but wonder "where their elders have been all these years."

However, picture No. 10 shows that the Government is taking models seriously. Here is shown John H. Geisse and Eugene L. Vidal, who is head of the Air Commerce Bureau of the Department of Commerce, intensely studying a model autogiro. This little ship is an exact duplicate of the "flivver" autogiro which is being developed by one of the large aviation companies. The unique features that the large autogiro will embody are folding rotors and the ability to travel along a highway under its own power to the aviation field from which it wishes to fly.

Picture No. 11 shows Bert Takemoto of 1477 Dillingham Blvd., Honolulu, Hawaii, with his gas job which he has recently completed. It is a copy of Bassett's former record-holding ship. Takemoto says that he has obtained flights with it of four minutes and hopes to better this time soon. It is interesting to know that the gas model craze is spreading to far-off Honolulu. This is the first picture we have had from the Islands of this type of ship.

Frank Fernandez of 2912 Main St., Tampa, Fla., writes us telling of his glider which he recently completed. He regrets he cannot send a picture of this ship as he intended to do. It appears that before a picture could be taken of it, it made a flight which was intended to be a trial, but the glider rose to a great altitude and flew out of sight. He says in his letter:

"The only thing I don't like about the building of the world's record glider, appearing in the February issue of your magazine, was that the author, Robert File, did not give any warning as to its excellent duration. As we were going to have a contest I thought of picking a sure winner. After working till late at night most every day, I finished assembling, papering, and partially doping it on Saturday, the 15th of June.

"I took the model out for its maiden flight on the next day, Sunday, at about twelve o'clock. As the sun was at its full height, it was very warm. The wind was blowing to the northwest. We had to launch it four times as it didn't have enough weight. We used about fifty feet of No. 40 thread. When the glider was perfectly balanced we launched it against the wind for its maiden flight.

"It rose to an altitude of about fifty feet and flew in circles over the same spot for over two minutes. Then it began to rise in circles. It flew beautifully, if this is the word, like a bird, calmly without stalling. Everyone around the neighborhood was looking at the glider. After running about three-quarters of an hour without stopping, over ditches, swamps, and holes I lost sight of it when it was way over the clouds.

"I felt sorry because I had lost it, but still was proud to say I made a model that flew away."

Frank intends to build another ship and promises to take pictures of this one before he flies it.

NEWS FROM OTHER COUNTRIES

Russia

Very little news has been available regarding model activities of the young men of Russia. Through the courtesy of Andrew Borysko of 1485 East Ninety-sixth St., Brooklyn, N.Y., we have obtained some pictures and information which may be of

interest. In picture No. 12 is shown an unusual looking biplane, built by members of the Osoaviachin Club in Leningrad, Russia, which at present is employing model aviation as a means of educating young men in this important industry. Information directly from Russia comes as follows:

On the 13th of June 1934 at Novo Sibirsk, a model constructed by a 16-year-old pioneer, Makarof by name, made a record flight of 1 hour, 40 minutes; landing two and one-half miles from the place of take-off. This model was a Canard type, employing a stabilizer in front of the wing instead of to the rear of the wing. The fuselage was a single stick with a pusher prop mounted in the rear. The model was launched by hand. The record-holders in this class are usually equipped with devices for dropping the rubber motor and the propeller and in this way increase the time required to glide back to earth. The previous All-Union record in this class had been held by Karabayev of Bashkir since 1928, when a model of his construction made a flight of 49 minutes, 59 seconds.

Other official Soviet records are:

Outdoor Fuselage Model—27 min., 20 sec. Distance 1¼ miles made by Zurin at the Second All-Union Meet held in Moscow in 1931.

Outdoor Fuselage Tailless Model—1 min., 40 sec. Distance 1,000 ft. made by Trunchenke at the Fourth All-Union Meet held in Moscow in 1933.

Fuselage R.O.W. Hydroplane—1 min., 26 sec. Made by Zurin in Moscow in 1934.

Fuselage Outdoor R.O.G. Glider—8 min., 51 sec. Made at Kieve by Popenko at the First Ukranian Meet in 1934.

Fuselage Outdoor Tailless Glider—2 min., 51 sec. Made by Golubev at the Fifth All-Union Meet at Koktobel in 1934. *Hand Launched Glider*—15 minutes.

Stick Autogiro—33 seconds. Made at the Fourth Meet by Gaievsky.

Fuselage Autogiro—11 seconds. Made at the Fifth Meet by Gaievsky.

Heliocopter—34 seconds. Made at the Fifth Meet by Kulaiev.

Ornithopter—13 seconds. Made at the Fifth Meet by Proskurnin.

Malta

From Joe Axisa of 16, S.S. Trofimo, Silema, Malta, comes a message and picture No. 13. The picture shows his biplane hydro tow glider. This is a most unusual airplane and not many young men have built machines of this type. Joe tows the machine into the air and has had it up to an altitude of 2,000 feet. On the last flight he tells us that the plane crashed from an altitude of 200 feet and it will be a little while before it can be repaired for future flights. It is a good thing that Axisa did not accompany the ship aloft, for we are afraid that he would not be available for further aviation experiments. A lot of credit is due Axisa for building this glider of the hydro type. However, we suggest that Joe try building some of the gas-powered models. He will find it less expensive and yet just as valuable as a means of experiment. It is just recently that Axisa built his first balsa airplane. He says:

"We are unable to get balsa wood or other model airplane material in Malta as no dealer stores it. All the local model builders who really want to build successful flying scale models have to send for kits and materials abroad."

It is a pleasure to see that the lack of balsa wood does not quench the "fire of genius" in some cases.

Czechoslovakia

It appears that MODEL AIRPLANE NEWS has made a new convert, for we hear from Arnost Klein of the Model Club of Prague-Liben. The complete address is Libensky Modelovy Krouzek, Prague X.-Karlin, Kollarova 7, Czechoslovakia. This is the first time that we have heard from this country and are pleased that model builders of Czechoslovakia find the news of American activities interesting. Klein writes:

"We are surprised by the rich and instructive contests and how beautifully it is made. Some time ago we corresponded with German model builders in Dresden and we now wish to correspond with some model builders in America."

We believe some of our readers will find it interesting and instructive to correspond with Mr. Klein and members of the Club.

Picture No. 14 shows an exhibit of fifty-four models which was recently held in Prague. Mr. Klein is most anxious to arrange an exchange of plans, designs, pictures, newspapers, etc., with model builders in this country. Mr. Klein tells us that they will be very pleased to publish American pictures or articles in the Czechoslovakia model airplane papers.

Japan

From far-off Japan Hiroyasu Minowa of No. 3 Wakamatsucho, Ushigome, Tokyo, has sent us a great deal of information and pictures which we will pass on to you next month. Our space here will not allow us to print the large volume of material. Mr. Minowa is a member of the Tokyo Model Airplane Club and he writes that they intend to hold a contest in the Hibija Park, in the center of the city of Tokyo, under the name of MODEL AIRPLANE NEWS Contest. To show the extent of model building and the enthusiasm for this sport in Japan, there are sixteen model clubs in Tokyo

alone. Mr. Minowa writes that he expects at least 500 champion fliers to attend the meet. It is not unusual to have 3,000 at a contest. We shall await with interest news of this contest.

France

Mr. J. Mahn, Secretary of the Escadre de la Rose des Vents, of 2 Boulevard des Filles du Calvaire, Paris (11), France, one of the leading model clubs of France, tells us that they recently held a contest for fuselage models. The record flight for the contest was 4 minutes, 15 seconds; the record being 5 minutes, 59 seconds. A glider record was established by Mme. Weber, the president's wife with a flight of 15 minutes, 21 seconds.

Next month we shall take pleasure in publishing pictures of interest which Mr. Mahn has sent us from this country.

New Zealand

An interesting note comes from Gordon P. Smith, Secretary of the New Plymouth Model Flying Club. Some time ago seven members of the New Plymouth Club left by car for the Hostel at North Egmont, and then on foot to the top of Mount Egmont (8620 feet high) to fly model airplanes. No snow was encountered until near the crater. The planes were watched with naked eye and binoculars and timed by a stop watch. The best flight of the day was with the Club's specially prepared plane, launched by the Club Captain, Mr. R. Ward. This plane flew for 32 minutes, 27 3/5 seconds, when it dropped into the clouds below the top of the mountain. After the watch was stopped the plane appeared again for a few minutes and then disappeared, still flying, into a heavy cloud belt. The flight of the next plane was for 29 minutes, 34 1/5 seconds, when it disappeared into the clouds. Five planes were started in all, the other three crashing unrecovered on the side of the mountain.

The two planes which are "still flying" have not as yet been recovered. These flights are the first flights in New Zealand, and it is believed in the world, to be made from the top of a snow-capped mountain. The climb up the mountain with the planes in boxes strapped to the boys' backs illustrates the interest of the New Plymouth Model Flying Club in model aviation.

All the members of the club are under eighteen years of age. Instruction Classes are held regularly every two weeks, together with Flying Classes. They expect to hold a model airplane show soon, entries to which have been received, at the time of writing, from all over New Zealand.

We wish to thank Mr. Smith for his very interesting account of an unusual activity.

Model Flying Club of Australia

Sometime ago the Club held a contest of extreme interest in Centennial Park. There were 247 contestants and a variety of models, a number of which disappeared from sight during flights. One model builder sent up a frog in his model plane and at a predetermined height the frog was released and descended in a gaily colored parachute. The ascent was about 80 feet. "The frog had no remarks to make at the end of the flight."

In addition to the regular monthly contest, exhibits were given of bomb-dropping, smoke-screening, parachute releases, inverted flying, speed and height flying. Sir Keith Smith presented the Angus and Coote Cup to G. Ratcliffe.

During the month of May the King's Jubilee flying meet was held in Centennial Park. It was conducted by the club. There were 132 competitors, including boys and girls. There was a great range of type and size of models. Some had a span of six feet and others four inches. Sir Keith Smith and Lady Snowden presented the prizes.

CLUB NEWS

Lawrence Model Airplane Club

Joseph F. Finn, Commander of the Lawrence Model Airplane Club, sends us picture No. 15 of a recent model airplane exhibition held at the third annual Pageant of Progress in this city. Over 50,000 people visited here and saw this display, which was made possible by the generosity of the "Eagle Tribune." This club is one year old this month and has been extremely successful during this first year.

In connection with the exhibition an indoor contest was held. It was voted the best contest ever held in Lawrence.

Connecticut Model Airplane Association

This Association recently staged the largest model airplane contest in its history. It was sponsored by the United Aircraft Corporation of East Hartford, Conn. It is impossible to give the complete list of prize winners as this information has not come to the office. However, the winners of the MODEL AIRPLANE NEWS prizes are: First prize, Ira Baldwin of 17 Roberta St., New Britain; second, Gordon R. Shenton, 114 Cliftion Ave., West Hartford, and Stanley Wolak, 71 Oak St., New Britain, third prize.

The contest was attended by young men from all over Connecticut and was one of the largest ever held. One world's record was broken in the Hand-Launched Duration Event. The contestants have Mr. Joseph E. Lowes, Jr., of the United Aircraft Corporation to thank for helping to make the contest such a success and securing many of the prizes donated by the many public-spirited concerns. Picture No. 16 shows a group of three winners. On the right is Ira Baldwin with the MODEL AIRPLANE NEWS trophy he won.

Jimmy Allen Flying Club

Recently the "Times"-Richfield Jimmy Allen Club held the second Gasoline Airplane Meet to be held in America at the Grand Central Air Terminal, Glendale, Calif. Picture No. 17 shows a group of the contestants with their gas jobs. The most outstanding performance was the flight of seven and a half minutes which was made by Louis Schock's model. The little model soared 1500 feet in the air, according to a National Guard pilot who checked the altitude, and landed several miles from the airport. Unfortunately the model was not to scale and could not be given first prize. First prize was given to a flying model of the Stinson Reliant owned by Frank Bertelli. Bertelli's model remained in the air for slightly more than four minutes.

Junior Birdmen of America

National Headquarters of the Junior Birdmen of America has announced that it will conduct a contest for gasoline-powered model planes, to be known as "THE FIRST ANNUAL GAS MODEL CLASSIC," at the Naval Air Station, Lakehurst, N. J., on Wednesday, Aug. 28, with the cooperation of the United States Navy.

This activity is being conducted for the benefit of members of the organization who have reached the ultimate goal in their chosen hobby. Gasoline-powered model airplanes embody principles of design which are closer to actual aerodynamic theories than any other classification of model planes. This contest will provide a suitable opportunity for boys who are in the advanced stage of model building to present their own theories in design and construction of flying models.

The gasoline engines which are used as power plants for the models to be flown in this competition are small enough to fit in the palm of a person's hand. Fuel is dropped in the tiny gas tank with an ordinary eyedropper.

The Gas Model Classic is being conducted by the New York Wing of the Junior Birdmen of America but will be open to members of all Junior Birdmen Wings throughout the country. It is being conducted under the supervision of Lawrence Shaw, National Director of the Junior Birdmen movement, and Irwin S. Polk, Contest Director. Nathan Polk, sponsor of Junior Birdmen Flight Squadron No. 1 of the New York Wing, and Director of the Bamberger Aero Club, has been appointed Deputy Contest Director to cooperate with the Birdmen organization in this activity.

Ten prize places have been announced with a first prize of $100 in cash and a permanent trophy. Other cash awards, trophies, stop watches, and aviation books are included in the list of prizes.

Further information, book of rules and regulations, and entry blank may be had by writing to the New York American Wing, Junior Birdmen of America, 220 South St. New York City.

Correspondents

Will some of our readers correspond with the following boys? They will appreciate it:

Vincent A. Hekel, 81 Oregon St., Long Beach, N.Y.

Frank Morrison, 840 Grand Concourse, New York City.

Paul Brumbea, Jr., 605 Powersdale Ave., Youngstown, Ohio.

Aviation Advisory Board

(Continued from page 34)

may be made smaller without increasing the landing speed of the plane. The reduction in size of the wings increases the high speed. The landing speed is not reduced by this procedure because the wings are so close to the ground that a cushioning effect is produced between the wing and the ground, which gives added lift and reduced speed with smaller wings.

Question: What is the name of the plane that broke the world's speed record and how much horsepower did it have?

Answer: The name of the ship is the Macchi Castoldi Racer, an Italian hydroairplane of 2600 horsepower. The high speed was 441 miles per hour.

David Zernoske of 758 Pelham Parkway, New York, wants to know the following:

Question: How do you find the area of wing with curved tips?

Answer: The area of a wing of this type may be obtained by multiplying the span of the wing by the average chord. The area may be found also by dividing the area bounded by the leading and trailing edges and tips into squares and triangles. The curved tips may be easily divided into triangles. Then by determining the area of each square and triangle and adding the areas together, you will get the total area of the wing. The area of any square or rectangular figure is equal to the height times the length. The area of the triangle is equal to half the altitude of the triangle times the base of the triangle.

Question: How do you find the area of a curved rudder or a curved elevator?

Answer: The area of such surfaces is found in the same manner as the wing with curved tips. By the method given the area of any surface may be determined.

Question: Does the type of airfoil you use change the area in any way?

Answer: No, the area of a wing is measured as described by multiplying the span by the average chord, the average chord being the average straight distance between the leading and the trailing edges.

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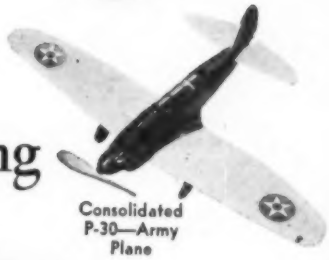

Consolidated P-30—Army Plane

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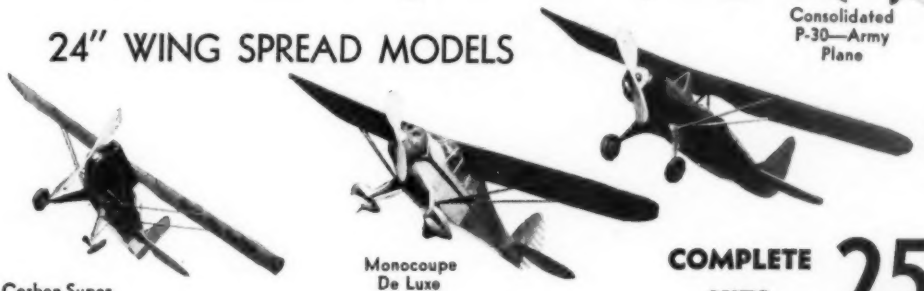

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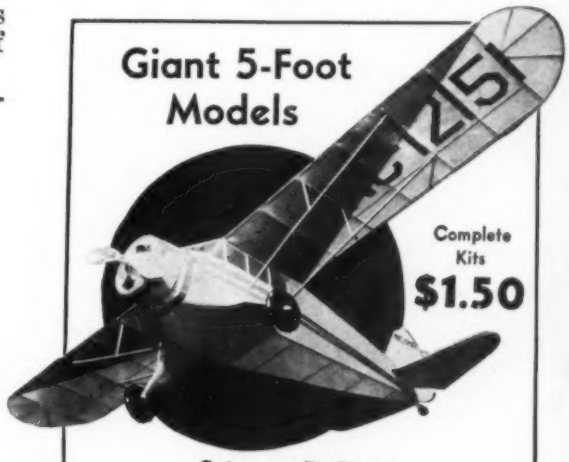

Complete Kits **$1.50**

Stinson Reliant

A joy to build and amazingly easy. This giant model is a real flyer. You can be the envy of all your friends with one of Megow's 5-Foot Stinson Reliant models.

Add 15c postage when ordering direct.

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BUILD C-D MODELS OF THE NATIONAL AIR RACE HISTORY-MAKING

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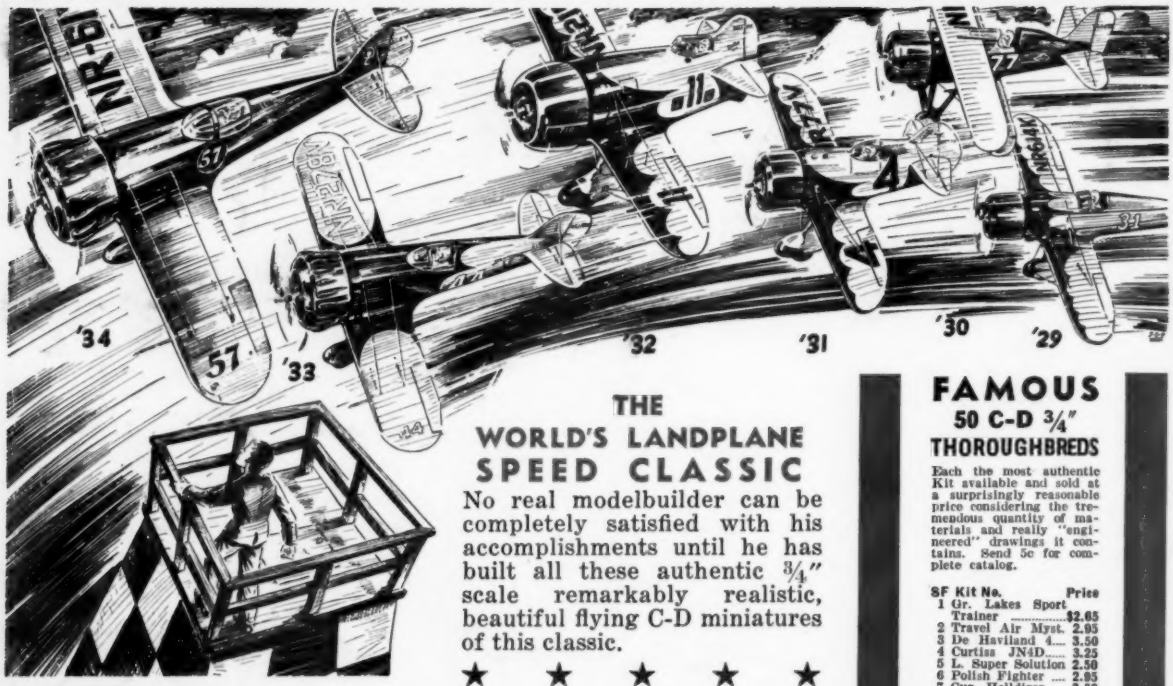

THE WORLD'S LANDPLANE SPEED CLASSIC

No real modelbuilder can be completely satisfied with his accomplishments until he has built all these authentic ¾" scale remarkably realistic, beautiful flying C-D miniatures of this classic.

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Most Highly Prized of All Model Groups

Be among the first to build this marvelous display of ¾" scale flying craft—for your room, or den, and possibly to be loaned out for displays at an opportune time (sometimes at a profit) for Chamber of Commerce or civic gatherings, displays for stores, schools, libraries and similar uses. Make a name for yourself in your community by having this beautiful lineup of 100% authentic C-D flying models. Kits are reasonably priced, too. The '29 winner, the Travel Air Mystery Ship, Kit SF-2, is only $2.95; the '30 winner, the Laird Racer, Kit SF-46, only $2.50; for 1931 Bayle's Gee-Bee Supersportster, Kit SF-17, $1.95; the '32 Doolittle's Gee-Bee Supersportster, Kit SF-27, $2.50; the '33 Wedell's own Wedell-Williams (same ship in which the late "Doug" Davis flew in '34), Kit SF-47, $2.95; Roscoe Turner's '34 Wedell-Williams, Kit SF-48, $2.95. Thus the price for the complete lineup of these six super models is only $15.80. Why not order the whole fleet right now, just as so many other advanced modelbuilders are doing—as single planes are no longer popular when it comes to really *good* models such as only C-D's are, for every real modelbuilder wants to make a *collection* of the type of ships he likes. So what could be more fitting than a complete lineup of "The Speed Classic of the Century." Order yours now and start making it during the Air Race period, then be ready to add the '35 winner to your fleet when it appears.

Pylon Drawing Given FREE

With every Kit of a ¾" Thompson Trophy winner purchased, we are giving away a FREE Pylon drawing. You get this fine sketch with which you may very easily make out of easily obtained material a small Pylon properly proportioned for ¾" scale models. It is very simply made for a standing display or motorized so that the model revolves about the Pylon. Of course only one Pylon is needed when you make a race display like that shown above, the other models are simply suspended, trailing the leading ship attached to the Pylon suspension. It's different! You'll be sure to like it and build it and we'll venture to say that after you see this display, if you haven't already purchased the complete lineup, you will want to build the other Thompson Trophy Winners, too, either one by one, or purchase the balance of what you do not already have.

SEE YOUR DEALER FIRST. If he can't supply you, order direct from us, giving us his name, address and the type of store he operates and we'll write him immediately, to encourage him to stock our Kits for your convenience. Why not use your influence urging him to stock C-D's too.

DEALERS

This is just the season to "jump" into the model business with our quality line and make a good showing right from the start. If you haven't already started a model department or if yours is lagging, in any way, let us send you our latest catalog and information fully describing our dealer's proposition—for the fastest-selling, most merchandisable line of fine scale model aircraft and supplies in history—a totally new advertising campaign, which, tied in with our complete hookup of national advertising, beautiful new boxes and all display literature, it will make your C-D model department one of the best in your store! Such new things couldn't be produced if C-D's were not popular! Send for this information today!

Schools and Clubs, Too! Write in right away for the unusual proposition we have worked up for classes and clubs!

FAMOUS 50 C-D ¾" THOROUGHBREDS

Each the most authentic Kit available and sold at a surprisingly reasonable price considering the tremendous quantity of materials and really "engineered" drawings it contains. Send 5c for complete catalog.

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16	Albatross D-5	2.50
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NOTE! See our ad in center spread for ordering rules, Dwarfs, etc.

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C-D

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